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JUNE 1955

# PIT and QUARRY

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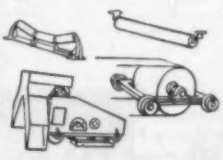

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# pit and quarry

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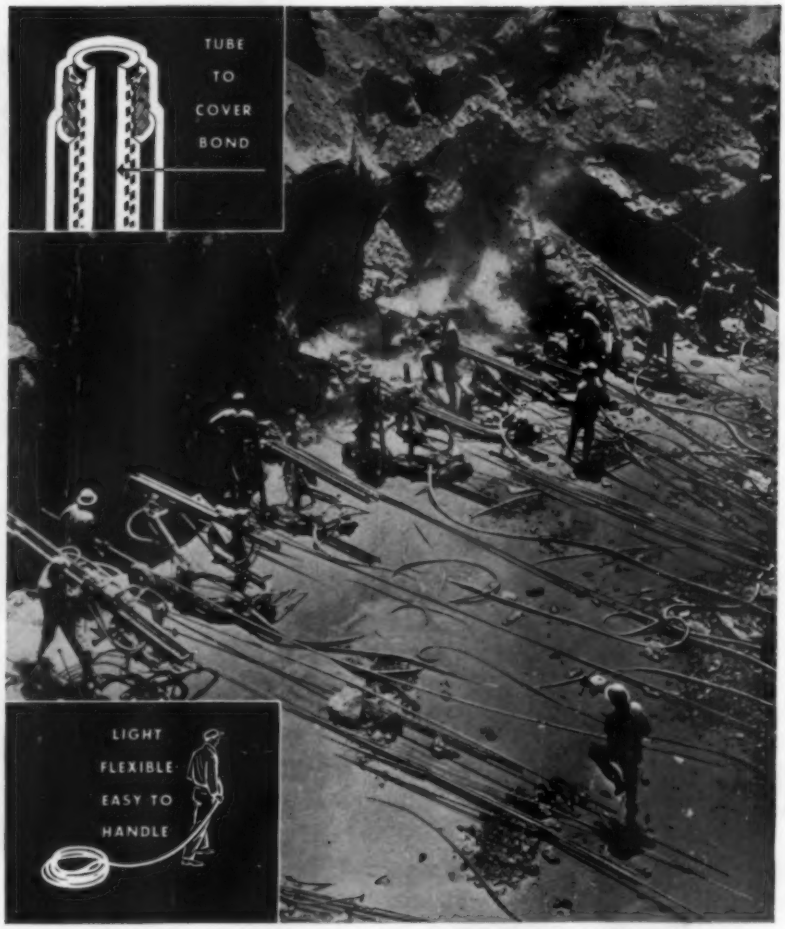


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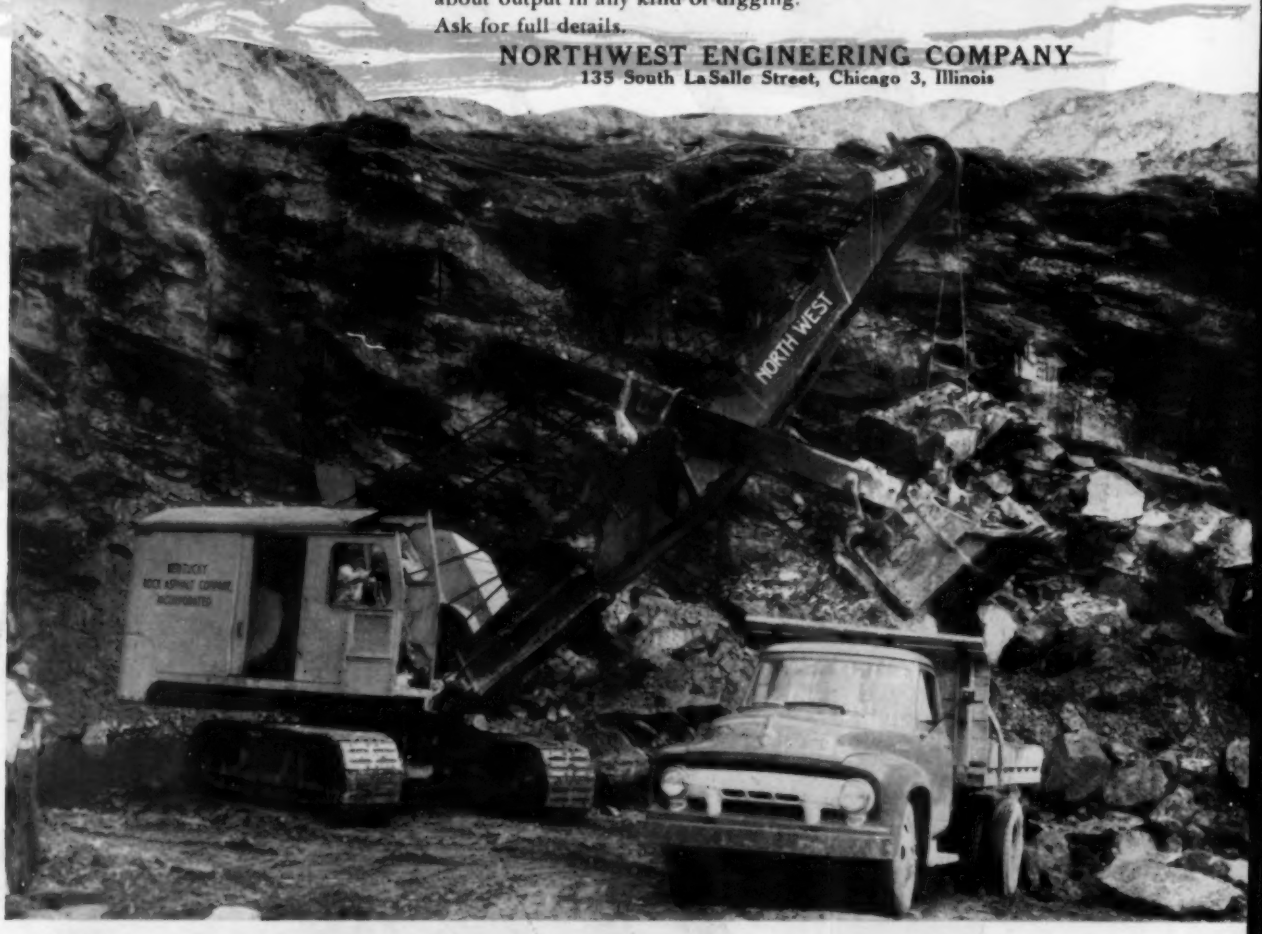


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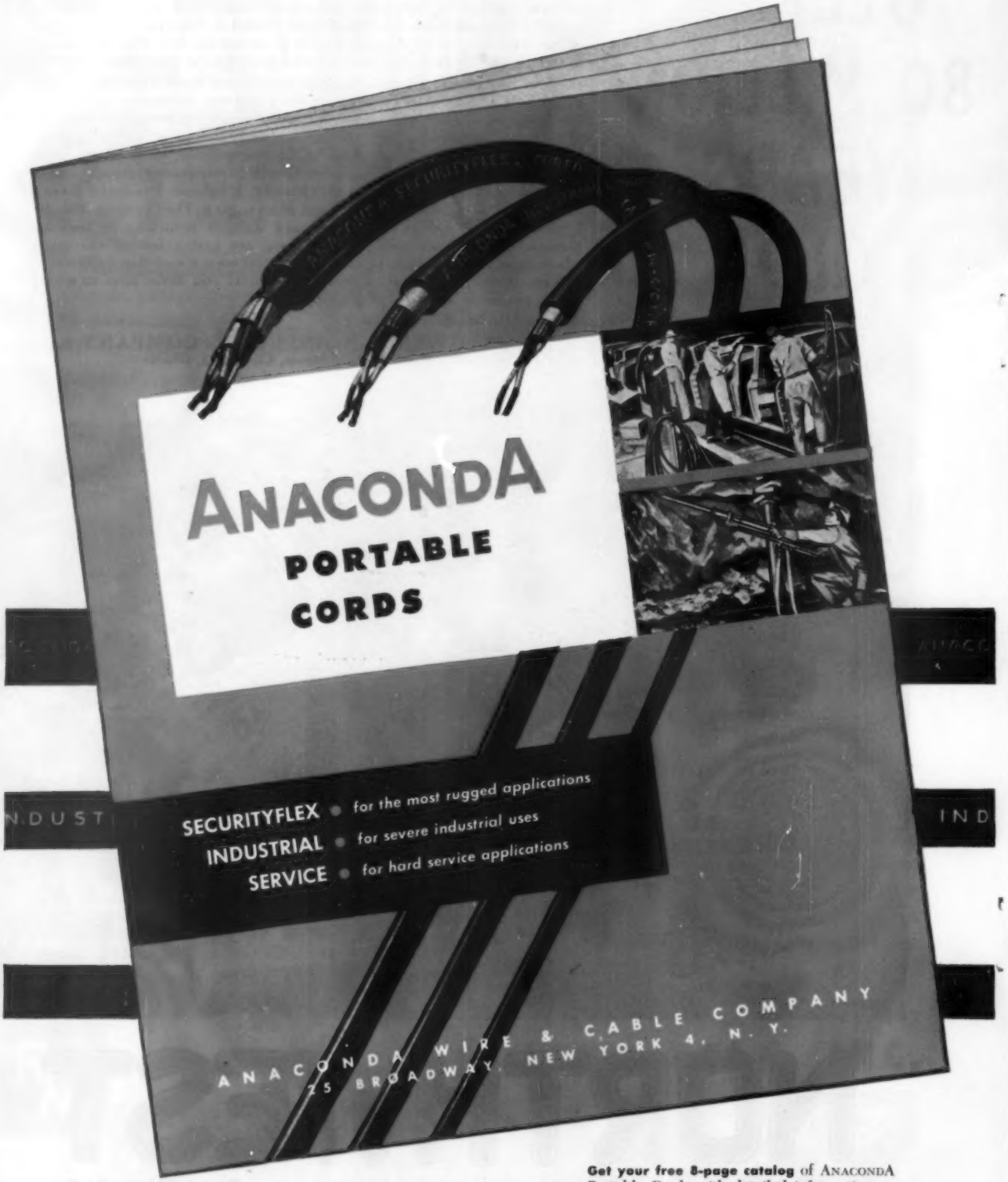
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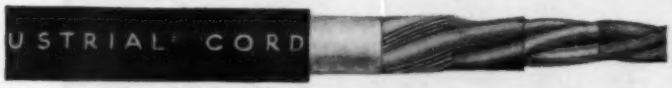


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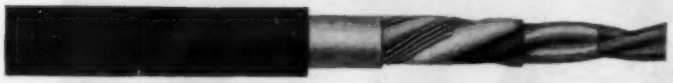

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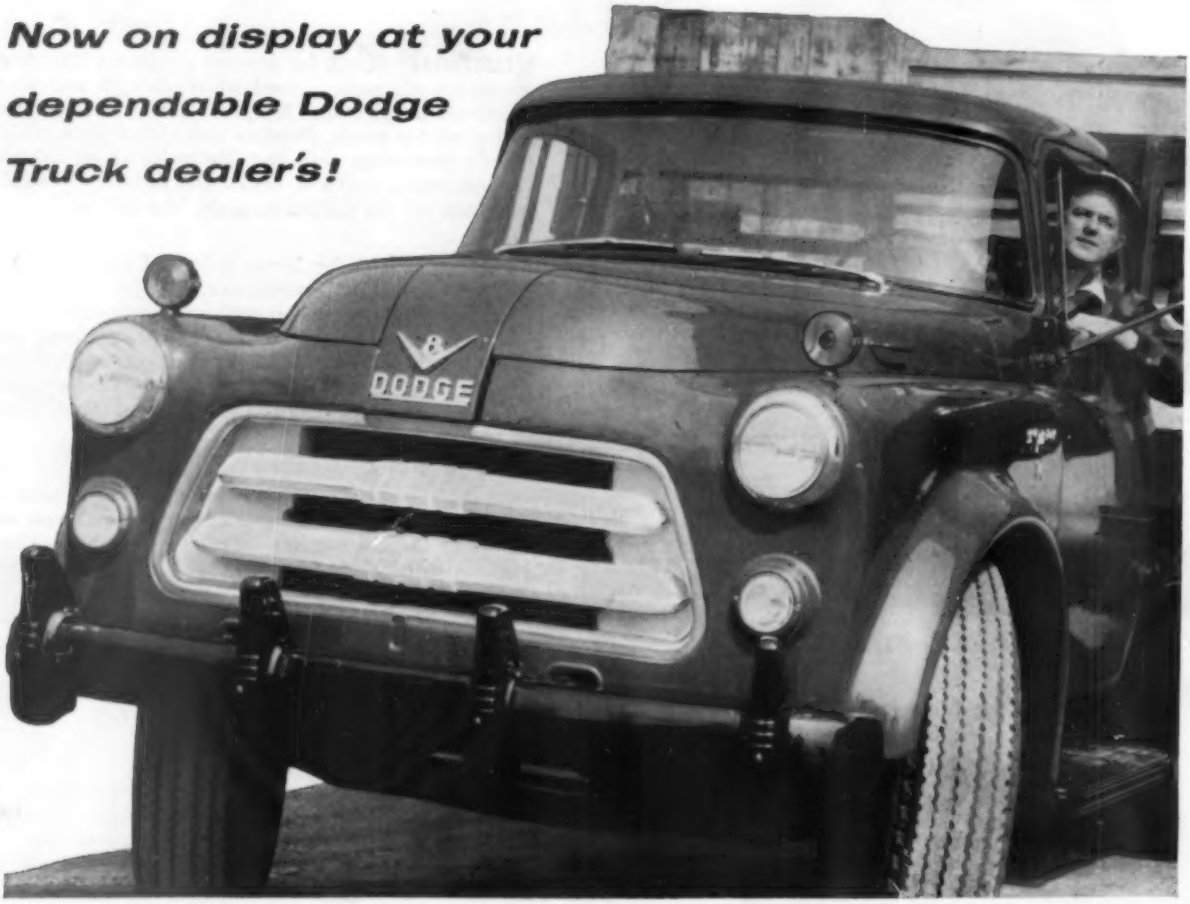

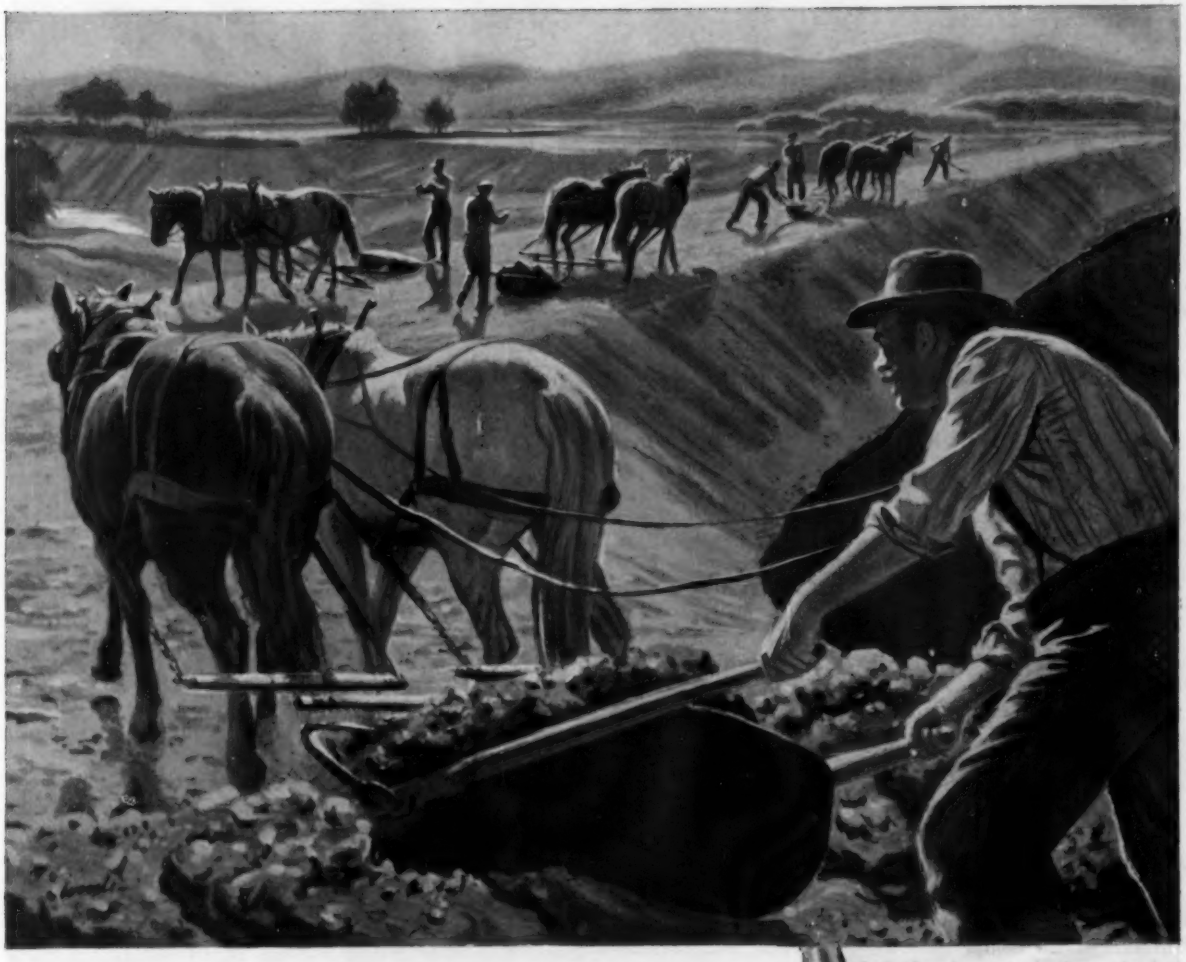

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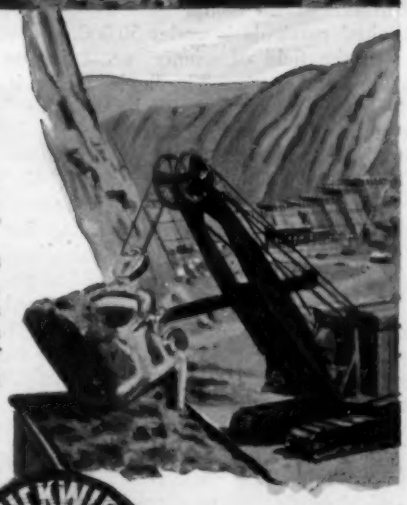

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# editorial

## *Engineers and Our Future*

THE growing shortage of engineers and scientists has for some years been receiving the serious attention of educators, top industry executives, and others who are interested in the future of this country. It is a matter of grave concern that in the face of the growing importance of science and engineering to our rapidly expanding and increasingly complex economy the number of engineering graduates is dropping every year. This in spite of desperate efforts on the part of industry and others to interest more students in this type of education.

This problem concerns not only the future growth of our industrial machine but also the future safety of this country. According to a recent article in the *New York Times*, the Soviet Union graduated 54,000 engineers in 1954 — a jump from 28,000 in 1950. In this country, by contrast, there was a severe drop in the same period. This country's colleges and universities awarded 50,000 engineering degrees in 1950, and in 1953, when industry needed 60,000 engineers, we graduated only 22,500. In 1954 the total dropped to 19,700. We now have about 600,000 engineers and 200,000 scientists; Russia has 500,000 engineers and 150,000 scientists.

THAT, however, is only a part of the story. Russia is training, for less specialized jobs, over one and one-half million students in intermediate technical schools. Enrollment in comparable U. S. schools with similar limited curricula is under 50,000.

In the field of science, according to this article, the same trend is seen. The Soviet Union is concentrating on the preparation of top-flight scientists. In 1946 the total number of degrees of candidates of science (roughly equivalent to our Master of Arts degree) was 3,188. By 1953 the number had jumped to 8,530. The total number seeking a candidate's degree is now well above 25,000, and several thousand are working for their doctorates. There are about 3,000 technical schools in Russia with an enrollment of about one million students.

The free world has long since ceased to sneer at Russian efforts to excel in various fields. During the Korean affair we learned that Russian planes were in many ways superior to ours; and more recently we have learned that we also underestimated her capacity to produce planes. Regardless of how Russia originally acquired the know-how to make atom and H-bombs, there seems to be no doubt that we learned from the Russians a better and cheaper way to manufacture them. In the field of athletics also Russia is rapidly gaining in stature, and there is considerable feeling among our experts that the 1956 Olympic Games will see the end of U. S. domination in track and field events.

THE same change is obviously taking place in the scientific and engineering fields — the Soviet Union has deliberately set out to take the lead in these fields just as it has in many others. Soviet technical training begins early; in elementary schools one-third of the course of study is given over to science. In the secondary schools the proportion of science and mathematics studies is about 40 percent. This emphasis increases steadily throughout university training.

Our own picture is disquieting. According to *Chemical News*, the percentage of high school students studying chemistry has dropped from 7.72 percent in 1900 to 7.6 percent in 1952; the percentage studying physics has steadily declined from 22.8 percent in 1895 to 4.3 percent in 1952; the percentage studying plane geometry has dropped every year, from 30.9 percent in 1910 to 11.6 percent in 1953. Further, less than half of those high school graduates qualified to do college work now actually enter college; and of the 20 percent of high school graduates with the highest intelligence only about 33 percent enter college. The number of newly-certified teachers of technical subjects has dropped over 50 percent since 1950, and only about 40 percent of those graduated as science teachers actually took such positions.

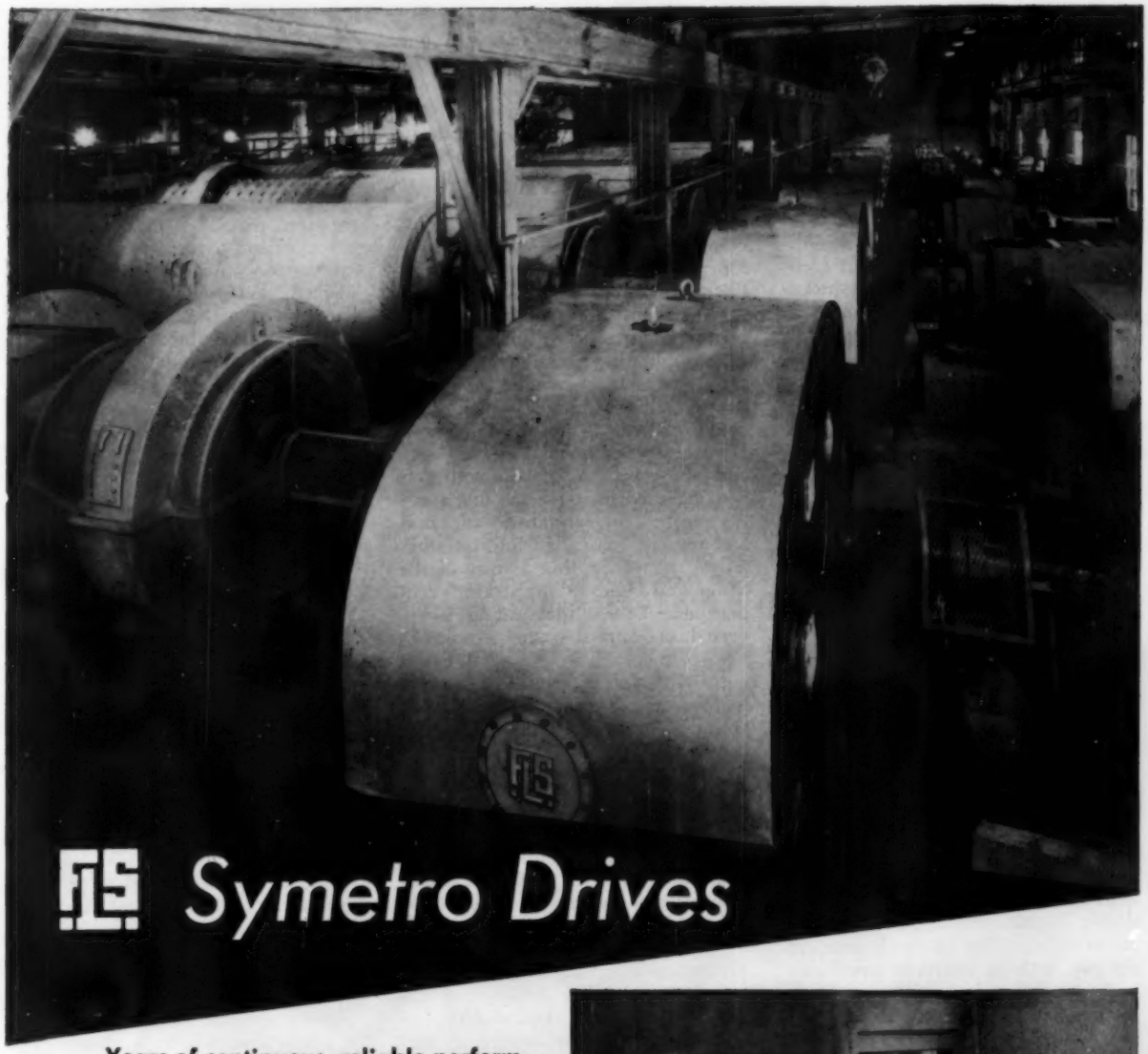
ALTHOUGH much has been said about our growing shortage of engineers, few good reasons or explanations have been advanced. We will venture to state, however, that the low scale of salaries paid to engineers (especially to beginners) in past years has had an important bearing. Except perhaps for teaching, engineering paid less than any other profession requiring a comparable amount of study and of intelligence. In the last few years the salaries paid to engineers have risen sharply, probably largely due to the growing shortage.

According to a recent 5-year survey made by the Twentieth Century Fund, millions of Americans now passing middle age have seen within their own lifetime a greater change in our patterns of life and material standards of living than in all the previous centuries of Western civilization. Technology, it is stated, has not only raised our standard of living to a level unrivalled elsewhere in the world — it promises through automation in manufacturing industries to relieve the worker of monotony and mental boredom, just as mechanization relieved him of heavy work and physical fatigue.

Technology was credited with enabling us to make vastly more efficient use of our existing natural resources. It will also be a means of expanding our usable resources by finding new ways of supplying needed materials.

Nonmetallic minerals producers and machinery manufacturers are urged to do everything they can to encourage young men to enter the fields of science and engineering, and to make them feel after graduation that they had not made a mistake. Many concerns are offering scholarships, providing technical training programs in their own plants, or co-operating with engineering schools in providing employment for students.

*Walter E. Trunkle*



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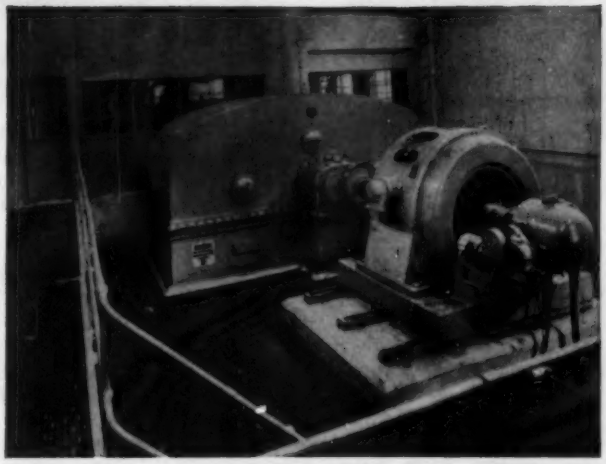

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# Washington News Letter

## New Wage and Hour Development

EVER since the Federal Wage and Hour law was passed in 1938, the problem of how to handle employees whose duties require irregular hours of work has created contention between employers, who

**By S. HERBERT UNTERBERGER**

would prefer to pay them a regular weekly salary and the Wage and Hour Administrator, who is required to administer the law so that all employees receive their time and one-half pay for hours worked in excess of 40 per week. Examples of such employees are outside buyers, on-call servicemen, insurance adjusters, and newspaper reporters.

To compute their pay on an hourly rate basis would result in wide variations in their week-to-week earnings. This is undesirable from both the employer's and the employee's point of view. To pay them a flat weekly salary regardless of the hours worked would mean that they would not get the benefits of the overtime provisions of the Wage and Hour law; it would be a violation of that law.

Very early in the history of the Belo Corporation, the nature of whose business required employees to work irregular hours, it tried to comply with its overtime provisions and still pay the employees their former weekly salaries. Belo entered into an employment contract with each of its employees. The agreement guaranteed that for each week they worked they would be paid for not less than 40 hours at a particular rate of pay which was at least as high as the legal minimum rate, plus an additional specified number of hours at one and one-half times that rate. This meant that for hours worked in excess of 40, they were never paid less than time and one-half and were frequently paid more; the overtime rate varied from week to week.

The Wage and Hour Administrator challenged the legality of this arrangement. After extensive litigation the Supreme Court upheld the position that nothing in the law prevented an employer from contracting with his employees to pay them the wages they had received prior to its enactment, so long as the new rates equalled or exceeded the legal minimum. Further, nothing in the law prevented fluctuation in the overtime rate or an overtime rate in excess of one and one-half times the regular rate.

Following this decision, the Wage and Hour Administrator issued regulations covering such arrangements for guaranteed weekly pay for a fluctuating work-week. These came to be called "Belo contracts". The regulations sought to limit as much as possible the situations to which such contracts were applicable and the conditions under which they could operate. When the Wage and Hour law was amended in 1949, specific authorization for Belo contracts was included in it for the first time. A recent interpretation of that amendment has called into question an important limiting feature of the Wage and Hour Administrator's regulations. Unless that ruling is reversed on appeal, many employers who formerly did not find it worth while to qualify for Belo contracts will find that they can now take advantage of that very convenient arrangement.

### Requirements of a Belo Contract

Employees who are required to work irregular hours may, according to the 1949 amendments to the Wage and Hour law, be paid guaranteed weekly amounts, provided the following conditions are complied with:

1. The employee's duties must *necessitate* irregular and fluctuating hours of work. The employer or employee must not be able to control or anticipate with any degree of certainty the hours worked from week to week.

2. The contract must specify a regular rate of pay of not less than the 75-cent hourly minimum.

3. The contract must specify compensation at not less than one and one-half times the regular rate for all hours worked in excess of 40 in any work-week.

4. The contract must provide for a weekly guaranty of pay. This must be paid for all weeks, no matter how short, in which the employee does any work.

5. The weekly guarantee, on the basis of the rates so specified, must cover no more than 60 hours.

In connection with the last requirement, the Wage and Hour Administrator's regulations tried to expand it somewhat by requiring that the number of hours for which pay is guaranteed must bear a reasonable relation to the number of hours which the employee is expected to work. When deciding the number of hours to be guaranteed, the employer was required to select a figure low enough so that it may reasonably be expected that in *a significant number of work-weeks* more than the guaranteed number of hours will be worked and further overtime pay based on the regular rate will be payable. If the reasonable expectation of the parties had not been borne out, they were required by this regulation to amend their contract accordingly.

It was this regulation which the U. S. District Court refused to uphold in a recent case.

### Salient Facts of the Case

In the case in which the court overruled the Wage and Hour Administrator, the employees in question were employed under guaranteed weekly wage contracts which established an hourly rate of pay for the first 40 hours in each work-week, with time and one-half for each hour over 40, and a weekly guarantee of an amount equivalent to the amount payable if 60 hours were worked.

It was clear that the nature of the work necessitated irregular hours. However, the typical fluctuations were between 35 and 50 hours a week. In only a very small percentage of cases (0.25 percent) did they exceed 60 hours. Work over 60 hours a week was not contemplated, and there was an instruction in effect that 60 hours was not to be exceeded without specific authority.

These practices were clearly contrary to the Wage and Hour Administrator's regulation, since it could not reasonably be expected that more than the guaranteed number of hours would be worked in a significant number of work-weeks. Nevertheless, the court found that although the employees worked in excess of the guaranteed number of hours in only an insignificant number of work-weeks, the arrangement did not violate legal overtime pay provisions.

It conformed with all the specific requirements of the law although it did not conform with the Administrator's regulation. The court reached the conclusion on the ground that Congress knew about the Administrator's additional requirement when it amended the law in 1949. If Congress had intended that that requirement be continued, it would have included this in the law. Having failed to do that, the regulation is unenforceable.

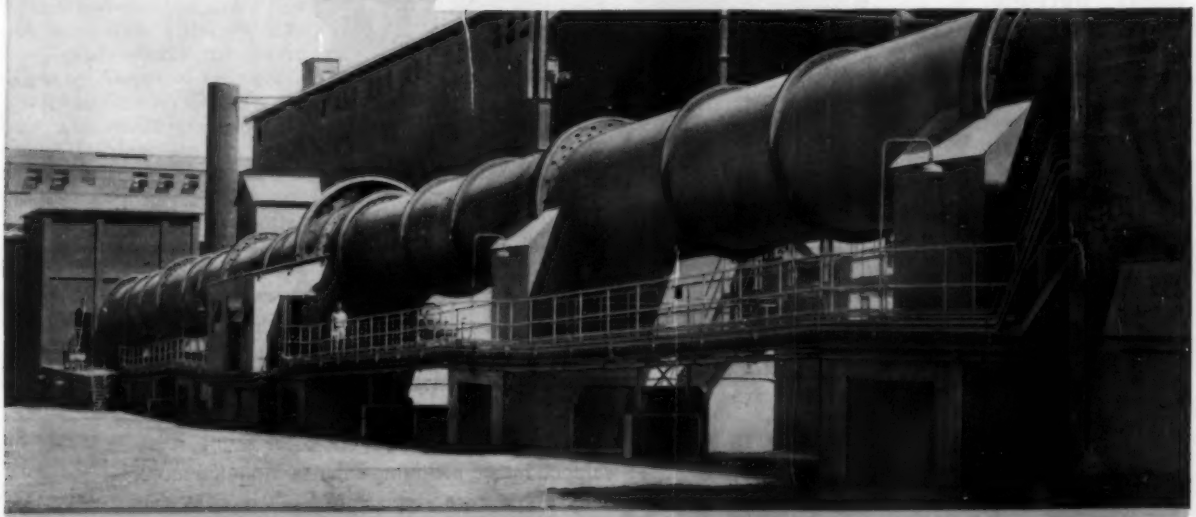
# *Let's talk* EXPANSION

**Have You Thought About What Could Be Done to Increase Plant Capacity . . . and Lower Production Costs?**

Expansion planning differs from plant to plant. In some operations, meeting increased capacity requirements calls for complete replacement of out-moded equipment.

In other operations, the answer lies in supplementing existing equipment or developing a more efficient flow of materials. Such expansion might call for more grinding or burning capacity. It could require better heat recovery or faster clinker cooling. Maximum fuel utilization, lower power consumption and reduced maintenance are other important considerations.

Regardless of your expansion requirements, Allis-Chalmers engineering assistance and industry-proved equipment can help you provide the desired increase in production at the lowest possible cost.



Allis-Chalmers engineering improvements make the application of the A-C rotary kiln the most efficient method of pyroprocessing. Patented heat-recuperating system saves fuel. Air cooled discharge end keeps kiln end round and rigid. True circle, all-welded construction insures best lining fit, long refractory life. Twenty-degree involute spur gears spread driving force equally. Floating-type riding rings provide adequate support and proper weight distribution.

When you call on Allis-Chalmers for assistance, you get the benefit of more than half a century of experience in developing and applying equipment for the cement, mining and rock products industries all over the world. For information contact your nearby A-C sales office or write Allis-Chalmers, Milwaukee 1, Wisconsin.

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Kilns, Dryers, Coolers

Grinding Mills

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**Over half of all cement manufactured in the U. S. is processed in Allis-Chalmers equipment.**

# ALLIS-CHALMERS

*for the most in a Compressor*

# IN THE LEAST SPACE

The Class "Y" compressor offers everything a good compressor should have for heavy duty service: high overall efficiency, long life with minimum maintenance; smooth, quiet operation, accessibility and simplicity, compactness and ease of installation. With one-piece frame, it is shipped intact, including a flange-mounted motor—truly a "package" type unit. Built in sizes 75 to 250 H.P., it is available in single and multi-stage designs for pressures up to 5000 pounds, with belted, coupled or flange-mounted motor drive.

Simplate Valves, efficient and easy-to-clean shell-and-tube intercooler, multistep capacity regulation, roller main and precision type connecting rod bearings are some of the reasons for the big compressor performance of these medium size machines.

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# news of the industry

PIT AND QUARRY

## Kaiser Gypsum to Erect $5,000,000 Board Plant At Pittsburg, Calif., Site

Officials of Kaiser Gypsum Company, Inc., have announced that a $5,000,000 gypsum board plant and plaster mill will be built by the firm at Pittsburg, Calif., to overcome a severe shortage of gypsum products in this fast-growing area. Construction is to start within 60 days, and the plant is scheduled to begin operations by August of next year.

The new Kaiser Gypsum plant will have an annual production capacity of 180,000,000 sq. ft. of gypsum board products and 20,000 tons of plaster.

Kaiser Gypsum, a wholly-owned subsidiary of Permanente Cement Company, currently is operating plants at Redwood City and Long Beach, Calif., and at Seattle. Capacity at Long Beach is now being expanded 60 percent; and the Seattle operation, first such plant in the Pacific Northwest (opened last fall), is running on a 24-hour-a-day schedule at 130 percent of designed capacity.

Raw gypsum ore for the plant will be supplied by Kaiser Gypsum's own bulk ore vessels from the company's quarries on San Marcos Island, Lower California. Kaiser Gypsum also owns deposits in Nevada.

## Kentucky Light Aggregates, Inc. Adds 2nd Kiln to Operation

As a part of a $200,000 construction program at its Shepherdsville, Ky., plant, Kentucky Light Aggregates, Inc., has started construction of a kiln which will double the company's production of lightweight expanded-shale aggregate. The additional kiln, however, will represent an increase in capital investment of less than 25 percent. This was made possible by a forward-looking management's provision for future expansion in designing the original installations. Thus, regular production will not be interrupted during the erection of the new kiln.

The company's product has been sold as far away as Florida and Wisconsin, and sales have exceeded the original plant's capacity. Introduced two years ago by the firm, the lightweight product in 1953 showed sales totaling 16,841 tons, and in 1954 sales totaled 64,649 tons.

The new kiln will be 8 ft. in diameter and 125 ft. long, and will take about three months to build. It is the second of the four kilns which the company plans to have.

## Lehigh Buys Land in Florida For Expansion at Bunnell

Lehigh Portland Cement Company has purchased nearly 3,000 acres of land northwest of Ormond Beach, Fla., at a cost of $290,000.

The marsh and scrub land is contiguous to other Lehigh holdings, and John C. Shumberger, Lehigh's director of properties, stated that the purchase is in connection with expansion at the Bunnell plant.

## Action of Justice Dept. Results in Cancellation Of Ideal-Superior Merger

All plans for the merging of Ideal Cement Company with Superior Portland Cement of Seattle have been abandoned as a result of the intervention of the Department of Justice.

Through its Anti-Trust Division the Department threatened injunction proceedings if the companies insisted upon consummating plans for the merger. It was indicated that a court test was possible, referring to the Clayton Anti-Trust Act's banning of "elimination of competition" by merger. (Ideal already owns the Spokane Portland Cement Company, and competition between it and Superior would naturally cease if a merger were effected.)

Officials of the two companies involved prefer not to participate in a costly court fight against the Department of Justice. Accordingly, the whole plan for an Ideal-Superior merger was abandoned.

## *Coming Events*

June 26-July 1, 1955—Atlantic City. Annual meeting, American Society for Testing Materials. Chalfonte-Haddon Hall.

July 14-15, 1955—Hot Springs, Va. Directors' Meeting, National Crushed Stone Association. The Homestead.

October 17-21, 1955—Chicago. 43rd National Safety Congress and exposition. Conrad Hilton, Congress, Morrison, and La Salle Hotels.

October 19-21, 1955 — Pebble Beach, Calif. Combined annual convention and operators' meeting, National Lime Association. Del Monte Lodge.

February 13-16, 1956—Chicago. 40th annual convention, National Sand and Gravel Association, 26th annual convention, National Ready Mixed Concrete Association, and combined exhibit. Headquarters, Conrad Hilton Hotel; exhibit, Coliseum.

February 20-22, 1956—Chicago. 39th annual convention, National Crushed Stone Association. Conrad Hilton Hotel.

MANUFACTURED BY
CEDAR RAPIDS, IOWA, U.S.A.

## April Construction Volume In Eastern States Highest Ever Recorded by Dodge

Contract awards for future construction in the 37 eastern states in April shattered many previous records, according to estimates of the F. W. Dodge Corporation.

The April, 1955, total of $2,322,-085,000 was 37 percent higher than April of last year. It established the following new peaks: (1) the April figure was the highest for any April in Dodge's 64-year history; (2) it was the highest for any month in history, except for May, 1951, when atomic energy contracts totalling nearly $1,000,000,000 swelled the total; (3) it brought the first four motnhs of 1955 to the highest level for any first four months in history; (4) all three major categories—residential, nonresidential, and heavy engineering—set new April records and new records for the first four months; (5) residential contract awards in April were the highest ever reported in any month.

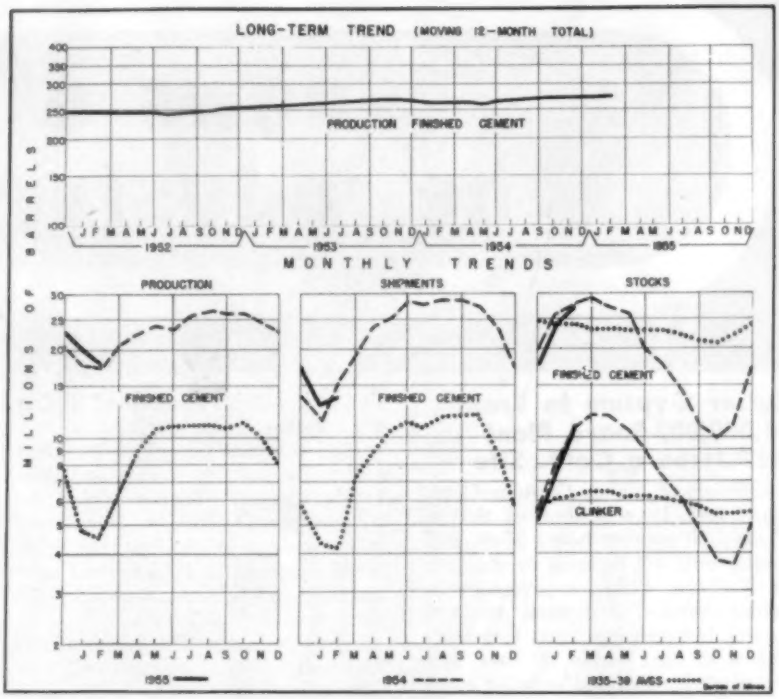
The April total construction figure also was 9 percent above March this year. Although this marked the eleventh consecutive year of rising construction volume, no significant surpluses are on hand.

Individual April classifications were as follows: nonresidential, up 17 percent over April, 1954, but down 7 percent from March at $706,019,000; residential, up 34 percent over April, 1954, and up 8 percent over March at $1,070,129,000; heavy engineering, up 88 percent over April, 1954, and up 41 percent over March at $545,937,000.

The four-month 1955 total construction figure was 35 percent above the comparable 1954 period at $7,-542,497,000.

Individual four-month 1955 totals compared with the like period in 1954 were as follows: nonresidential, up 23 percent at $2,564,140,000; residential, up 43 percent at $3,494,-316,000; heavy engineering, up 38 percent at $1,484,041,000.

An interesting sidelight was brought out in the fact that during the first quarter of 1955 industrial contract awards were almost 26 percent ahead of the figure for the same period in 1954—a trend representing the first upturn in the industrial category since 1951. Dodge stated that despite the heavy emphasis on housing, in 1954 housing accounted for only about 43 percent of the total contract awards, the remaining 57 percent representing nonresidential and heavy engineering construction.




SUMMARY—Production of finished portland cement in February, 1955, as reported to the U. S. Bureau of Mines, totaled 17,612,000 barrels—an increase of 4 percent over the February, 1954, figure. Mill shipments totaled 13,806,000 barrels—9 percent less than in February, 1954—while stocks of 27,017,000 barrels of finished portland cement on hand at the end of the month were 2 percent less than on the same date a year ago. Clinker production during the month totaled 20,767,000 barrels—an increase of 10 percent from the February, 1954, figure.

PRODUCTION—One hundred and fifty-six (156) plants located in 37 states and Puerto Rico reported a production of 17,612,000 barrels of finished portland cement during February, 1955, as compared to a production of 16,895,000 barrels in the same month the preceding year.

Clinker production during the month was 20,767,000 barrels, compared to 18,910,000 barrels during February, 1954.

Clinker figures for 1955 are not strictly comparable with those of 1954 and earlier years because producers now are asked to report clinker in terms of the number of barrels of finished cement that could be produced from the quantity of clinker in question, whereas previously the unit of measure was the 376-lb. barrel.

Separate data on high-early-strength (Type III) and prepared masonry cement appear again in this report. Production of high-early-strength portland cement in February, 1955, totaled 1,114,000 barrels, and the output of prepared masonry cement was 1,077,000 (376-lb.) barrels.

SHIPMENTS—Mill shipments of finished portland cement were 9 percent less than in February, 1954, and totaled 13,806,000 barrels. This figure and district totals that comprise it are not strictly comparable with mill shipments figures of 1954 and previous years because they do not include, as in the past, the number of barrels of finished portland cement used in the manufacture of prepared masonry cement.

Shipments in February were higher in 6 districts and lower in 14 districts than in February, 1954. Very substantial gains were registered in northern California and Puerto Rico. The greatest decline was registered in Kansas, and six other districts showed declines ranging from 20 to 30 percent.

Mill shipments of high-early-strength portland cement in February, 1955, totaled 703,000 barrels, the bulk of which was shipped from mills in the eastern Pennsylvania-Maryland, Michigan, and Alabama districts.

Mill shipments of masonry cement in February, 1955, totaled 755,000 barrels, the bulk of which was shipped from mills in the eastern Pennsylvania-Maryland, Indiana-Kentucky-Wisconsin, and Virginia-Georgia-Florida-Louisiana-South Carolina-Mississippi districts.

## U. S. Gypsum Begins Building New Plant in New Orleans

United States Gypsum Company has begun construction of a multi-million dollar plant on an industrial canal at New Orleans, La.

T. T. Youngfelt, the firm's chief engineer, stated that the site acquired for the operation is of "excellent quality", and that the plant will produce about 20 carloads of sheetrock, gypsum wallboard, plaster base, and sheathing daily.

The board of U. S. Gypsum agreed to sign a tripartite contract with the New Orleans Public Belt Railroad and the Louisville and Nashville Railroad Company to enable Public Belt use of L&N tracks. Life of the contract is 15 years and it cannot be cancelled without five years' prior notice.

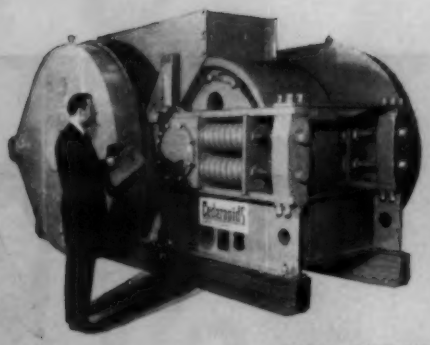
BIG MACHINES

# BIG PROFIT

BIG PRODUCTION

Cedarapids

Built by IOWA

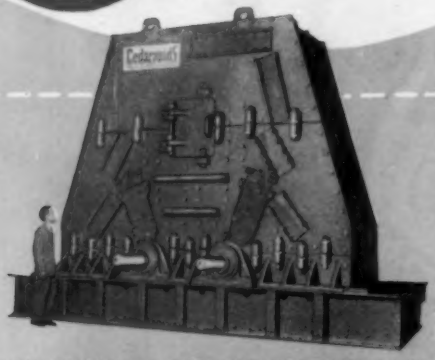


## ROLL CRUSHERS

This new 55″ x 30″ Roll Crusher is a *big* producer for secondary crushing operations. Large diameter of the rolls handles exceptionally large feed. With 20% wider roll shells, capacities range up to 520 tons per hour, depending upon conditions.

8 ROLL CRUSHER SIZES MEET EVERY NEED

| | | | |
|---|---|---|---|
| 16″ x 16″ | 30″ x 18″ | 30″ x 25″ | 40″ x 24″ |
| 24″ x 16″ | 30″ x 22″ | 40″ x 22″ | 55″ x 30″ |

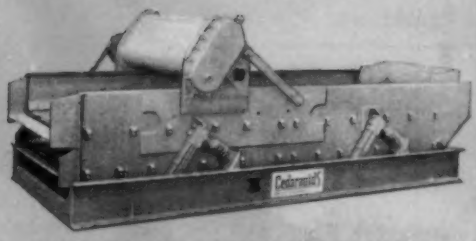


## DOUBLE IMPELLER IMPACT BREAKERS

This big Breaker reduces rock from 53″ x 60″ down to 3″ minus in one pass and turns out from 500 to 800 tons of ideal cubical shaped aggregate per hour!

AVAILABLE IN 7 SIZES

| For portable or stationary plants | For stationary applications |
|---|---|
| Model 2222 | Model 4350 Standard |
| Model 3042 | Model 4350 Heavy-Duty |
| Model 3645 | Model 5360 Standard |
| | Model 5360 Heavy-Duty |



## HORIZONTAL VIBRATING SCREENS

The *horizontal* position of the screen cloth openings permit *more* of the correct size material to go through the screen, yielding 20% to 30% more accurate gradation and more yards per hour. A horizontal screen provides as much as 12½% greater screening area than an inclined screen of the same length! You can use a smaller screen, get the same capacities as with a larger inclined screen.

Available in single, double and triple deck models in sizes ranging from 3′ x 8′ to 48″ x 14′.

## JAW CRUSHERS

The big 32″ x 40″ Jaw Crusher is the ideal unit for big primary crushing operations because it's engineered in every detail to give *extra* capacity with smooth, steady performance and low maintenance and operating costs.

AVAILABLE IN 12 SIZES

| | | |
|---|---|---|
| 10″ x 16″ | 15″ x 24″ | 22″ x 25″ |
| 10″ x 20″ | 15″ x 36″ | 22″ x 36″ |
| 10″ x 24″ | 18″ x 24″ | 25″ x 40″ |
| 10″ x 36″ | 18″ x 36″ | 32″ x 40″ |

## SYMONS® CONE CRUSHERS

Supplied as individual units or in Cedarapids Secondary Plants and Scalping Units. Nordberg-built Symons Cones give you big-volume, low-cost finished crushing of even the hardest or most abrasive rock or gravel to uniform, finely-crushed aggregate.

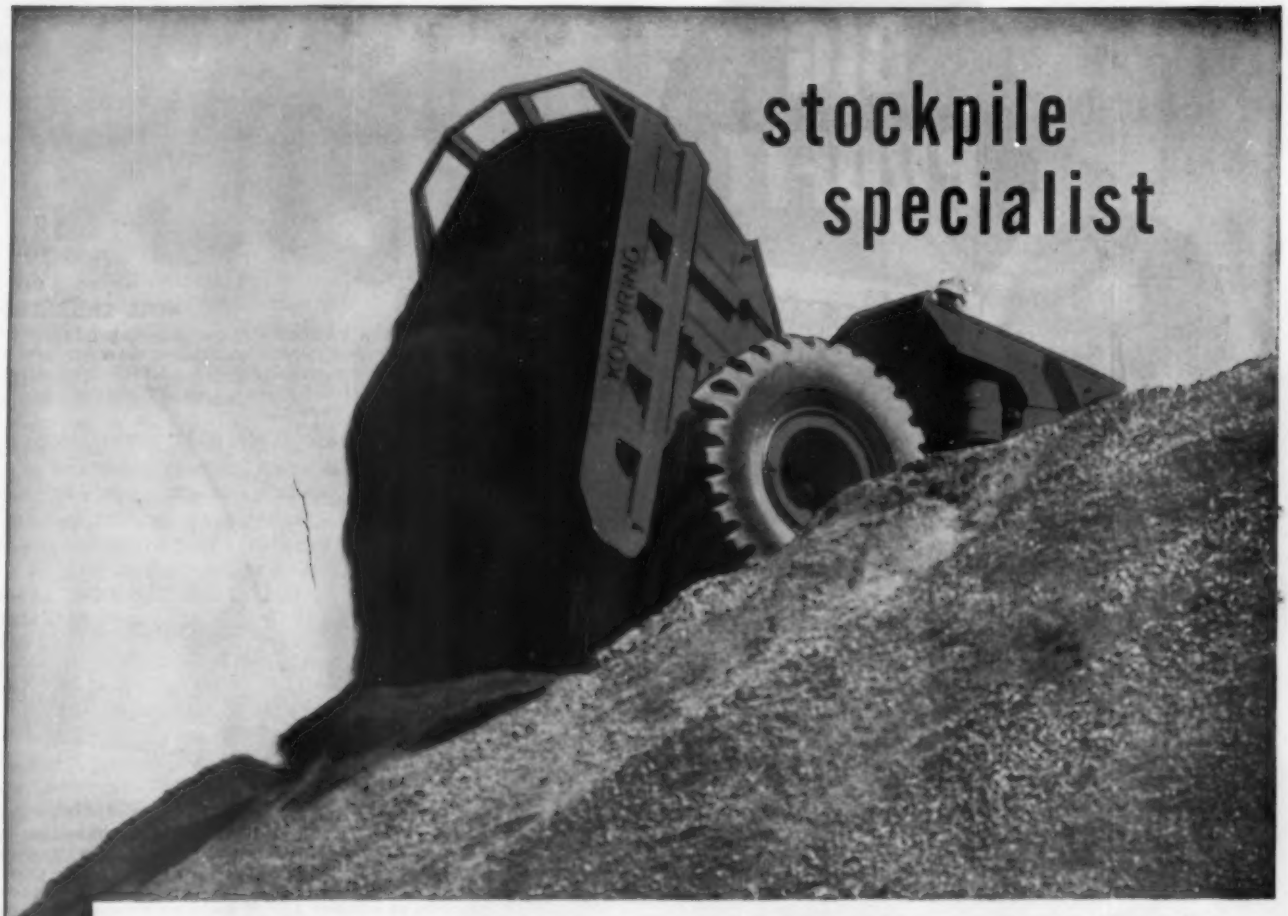
SIZES AVAILABLE

22″, 2′, 3′ and 4′

SYMONS—*A registered Nordberg trademark*

# IOWA MANUFACTURING COMPANY

## CEDAR RAPIDS, IOWA, U.S.A.




# stockpile specialist

## KOEHRING 6-yard DUMPTOR®

puts stockpiling on a fast, shuttle-haul basis. There's no need to turn at the loader, or on top of the pile, because constant-mesh transmission gives full-speed travel in either direction. This no-turn advantage saves at least 2 slow turns on every trip . . . cuts 30 seconds off normal cycle time.

To dump, operator drives up to edge of stockpile, trips the body-release lever . . . and the gravity-dump body instantly tilts 70°. Fast dumping action kicks the load out over edge of bank, saves a lot of dozer clean-up on the pile. There's no 15 to 25-second wait for slow-acting body hoists. What's more, gravity-dump never balks, never wears out.

Let your Koehring distributor show you what these practical Dumptor advantages can mean in increased production and lower costs on your stockpiling and other off-road hauling jobs.

CK438

KOEHRING COMPANY, Milwaukee 16, Wisconsin (SUBSIDIARIES . . . .

Stockpiling operation (above) shows typical no-turn shuttle advantage. Dumptor drives up to the edge of stockpile, body forward . . . dumps, and heads back for the next load, without turning.

From top of stockpile, Dumptor returns to loader via access ramp . . . or, as shown at left, can continue on down side of stockpile after dumping load. (Climbs 24% grades fully loaded.)

Big, square body opening permits loading over ends or sides by shovel, dragline, or conveyor. Dumptor pulls up, loads, drives away . . . without making a turn.

. . JOHNSON • PARSONS • KWIK-MIX)

# CENTRAL CEMENT FEED

**prevents gumming**

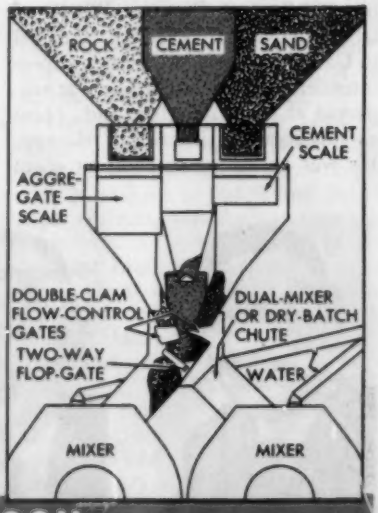
**reduces dusting**

**pre-shrinks materials**

Johnson Concentric Batcher provides these practical advantages for fast, economical weigh-batching of aggregates and cement:

- Concentric arrangement of aggregates around the cement batcher discharge gives central cement feed. This prevents "gumming", reduces dusting, pre-shrinks materials. All ingredients are intermingled as they flow through discharge.
- Cement, concrete's most expensive ingredient, is weighed individually on a precision-beam scale, in a separate batcher hung within the aggregate hopper.
- Adjustable rate of discharge on cement permits extremely accurate ribbon-feeding. Semi-automatic cement arrangement cuts off just ahead of final weight.
- Aggregates are weighed on accumulative dial scale, or on individual weigh-beam scales.
- Two-way discharge with dual chutes are available for charging 2 stationary mixers, or for charging into 1 stationary mixer and a truck-mixer, or dry-batch truck.
- Concentric Batcher sizes range from 2 to 8 cu. yds., and can be arranged for 2 to 8 aggregates — plus 1 to 4 types of cement. Choice of controls: fully automatic air-ram operated, semi-automatic, or manual, to best suit your needs.

Let your Johnson distributor show you all the other production advantages you will get with one of these patented Concentric Batchers in your plant. See him, or write to us.

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CONCRETE PLANTS • BINS • RECEIVING HOPPERS • ELEVATORS • SILOS • BUCKETS

## Nygaard Succeeds Linquest At Universal's Duluth Plant; Englin Given Promotion

A retirement and two promotions in the operating department of Universal Atlas Cement Company has been announced by W. O. Lawrence, assistant vice-president and general operating manager of this United States Steel Corporation subsidiary.

Martin E. Linquest, plant manager of the Duluth, Minn., plant retired on April 30 after 46 years of service with the company. Roald W. Nygaard, assistant plant manager of the company's Buffington, Ind., plant since 1954, has been appointed to succeed Mr. Linquest. Sidney C. Englin, general operating foreman at Buffington, Ind., plant was appointed assistant plant manager at the Buffington plant, succeeding Mr. Nygaard. Both appointments became effective May 1, 1955.

Mr. Linquest joined the cement company in 1909 as a tester at the Buffington, Ind., plant. In January, 1917, he was transferred to the Duluth, Minn., plant and in May of that year became employment and safety inspector. Two years later he was promoted to operating foreman and in 1943 to assistant plant manager. In 1951 he was appointed plant manager, a position which he held until his retirement.

Mr. Nygaard attended the University of Illinois. Mr. Nygaard joined the Carnegie-Illinois Steel Corporation in Chicago as clerk in 1930, and in 1935 was employed as ingot weigher at Carnegie's Gary works plant. In 1941 he became assistant to the division superintendent and in 1945 transferred to the Pittsburgh office of Carnegie-Illinois as labor analyst. In 1948 he returned to Gary as assistant to division superintendent. Later in 1948 he was employed at the Buffington, Ind., plant as supervisor of industrial relations. He was promoted to assistant plant manager in 1954, his last position before his new appointment.

Sidney C. Englin has been with Universal Atlas since 1918. He advanced from clerk at the Buffington, Ind., plant through various posts until he became burner building foreman in 1939. He served in this capacity until 1946, when he was promoted to mechanical foreman. Subsequently he was made general Lumnite foreman and (in January, 1952) assistant general operating foreman. In April, 1952, he became general operating foreman, the position which he held when he received his latest promotion.

### International Cement Corp. Picks British Columbia Site

According to officials of the International Cement Corporation, Ltd. (subsidiary of C. F. McDougall Associates, Dallas, Tex), this firm is planning to erect a plant at Popcum, near Chilliwack, B. C., in the near future. Cost of the installation will be between $6,000,000 and $7,000,000.

Wallerstone Construction Company of London, England, is the general contractor for the project. Site preparation will begin as soon as Wallerstone personnel have established headquarters there. Equipment, ordered through British engineering interests, is expected to be installed within six months; and operation is scheduled to begin at full capacity in about one year.

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Kaiser Engineers Division of the Henry J. Kaiser Company has successfully tested "fluid" petroleum coke at the Permanente Cement Co., Permanente, Calif. This new fuel was manufactured by a process which changes heavy, low-value residual oils to a lighter, more valuable fuel. The injections, made during kiln firing, neither interrupted nor reduced output of normal operations.

Roald W. Nygaard

Sidney C. Englin

Martin E. Linquest

## Judge Denies Injunction To Close Riverside Plant—Cites Cement Shortage

The potential impact on southern California business and industry of a work stoppage at the Riverside Cement Company's Crestmore plant was cited recently by Superior Court Judge John Gabbert as the major reason for his denial of a request for a preliminary injunction by property owners. The latter had requested the action in a suit against Riverside for $36,500, claiming that dust from the operation was ruining their lemon grove.

Judge Gabbert stated that a shutdown at the plant would result in a loss in pay to the Riverside area of about $2,000,000 per year and would throw 500 persons out of work. He declared that this stoppage would result in a 15 percent shortage of cement needed for important construction in this area.

Institution of proceedings would close the plant for a period of six months to a year pending a trial. While admitting that the property owners were suffering a loss, Judge Gabbert felt that action to close the plant would result in a greater loss to more persons.

Although the injunction was denied, no clear indication was given of the nature of a final decision if a trial should ensue.

### Sale of Santa Cruz Portland To Marquette Under Way

Stockholders of the Santa Cruz Portland Cement Company have been advised that negotiations are under way for sale of the firm to the Marquette Cement Mfg. Co.

Sales of Santa Cruz have grown from $1,714,421 in 1945 to $5,597,491 in 1953. This firm, founded in 1905, has its operating plant at Davenport, Calif. Marquette has been reported in the field for a Western outlet for some time.

### Mica Mining at Heflin, Ala. Started by Dixie Mines, Inc.

Mining of mica ore has begun at the Dixie Mines, Inc., operation at Heflin, Ala. Effort is also being made to get the separation plant located a short distance below Micaville, Ala., into operation. The $125,000 grading and drying plant will be located at Heflin.

The firm controls 800 acres of land in the area, and it has been estimated that 120 acres will provide 10 years' work at capacity production. Once the separation plant gets into operation, it will run on a 24-hour schedule.

## Kennedy Named Chairman Of Kennedy-Van Saun— Reedy Becomes President

At the annual stockholders' meeting of the Kennedy-Van Saun Manufacturing and Engineering Corporation J. E. Kennedy, who was formerly president of the concern, was named chairman of the board. Mr.

F. O. Reedy

Kennedy recently celebrated his 92nd birthday. He was succeeded in his former post by F. O. Reedy, who has been vice-president and general manager of the corporation for the last 20 years.

Other officers elected are as follows: Byron Pyle, executive vice-president; Maurice Shafer, vice-president; Frank Irving, secretary-treasurer; Thomas McDermott, assistant treasurer; R. M. Kennedy, assistant treasurer; and Ray Safian and John H. Bausch, assistant secretaries.

Mr. Reedy joined the firm in 1920, coming from the American Car and Foundry Company, where he had served as production engineer. He has had wide experience in many countries specializing in munitions and heavy machinery. He had served Kennedy-Van Saun in various capacities at the Danville plant and since 1935 as vice-president and general manager.

### Presque Isle Corp. Reports First Limestone Shipment

According to an announcement released by N. D. Shafer, general manager of the Presque Isle Corporation's stone plant near Alpena, Mich., the first lake shipment was made recently from this new multimillion-dollar installation.

This newly-completed plant, which is operated by the Chemstone Corporation (formerly the Kelley Island Company) on a fee basis and which receives royalties for the product, was financed by six large steel concerns. High-calcium metallurgical limestone is shipped to steel mills at Cleveland, Chicago, Buffalo, and Detroit.

Presque Isle Corporation has 200 men on its payroll, and the plant is now running at full capacity. It was built on a 150-acre tract which was formerly a quarry owned by the Kelley Island plant. Wayne Hancock, of Republic Steel, is president of the firm.

### R. S. Gerstell, N. O. Wagner Promoted by Alpha Portland

R. S. Gerstell, who was formerly vice-president in charge of sales for the Alpha Portland Cement Company, Easton, Pa., was recently advanced from this post to that of executive vice-president.

At the same time Norman O. Wagner was elected to fill the position formerly held by Mr. Gerstell. Mr. Wagner previously had been assistant vice-president.

• Mrs. Gerald Ryan and Mrs. Byron Pyle congratulate their father, James E. Kennedy, chairman of the board of Kennedy-Van Saun Manufacturing & Engineering Corp., at a party recently held in honor of his 92nd birthday. Mrs. Kennedy is at the left. The gathering was attended by 400 friends and co-workers.

## New York Trap Rock Corp. Announces Acquisition Of W. Nyack Trap Rock

New York Trap Rock Corporation officials have announced that the firm has exercised an option to purchase the land, plants, and equipment of the West Nyack Trap Rock Company, West Nyack, N. Y. According to Wilson P. Foss, III, president, New York Trap Rock, the purchase price will be in excess of $1,000,000.

The date for closing of title will be no later than December 15, 1955, although the closing can take place any time after December 1. Acquisition of the West Nyack plant and property from Walter and Herbert Dahm, the present owners, will replenish the 28,000,000-cubic yards of stone which Trap Rock has quarried at its present plants since the close of World War II.

The West Nyack property, Mr. Foss stated, comprises over 150 acres of land, 120 of which are stone bearing and contain an estimated 25,000,000 cu. yd. of crushed trap rock. The plant has an annual stone producing capacity of 500,000 tons. There are, in addition, plants for processing bituminous and concrete materials.

In detailing the plans to purchase the West Nyack property Mr. Foss said, "In addition to replenishing our stone reserves, we are preparing to meet the demands of a period of new highway and road construction which will be of major proportions in the next ten years."

### Robert H. Parham Appointed To Texas Industries Staff

Appointment of Robert H. Parham as manager, Public Relations Department, Texas Industries, Inc., has been announced in Dallas by Ralph B. Rogers, president.

Mr. Parham succeeds Charles Yeager, who has been named manager of the marketing department.

A consultant in public and industrial relations, Mr. Parham formerly served on the executive staff of the General Electric Company in New York. He is a director of Physicians Life and Accident Insurance Company of America.

A graduate of The University of Oklahoma, Mr. Parham worked as a bureau manager and business representative for the United Press Associations until 1941, when he went into military service. During World War II he served as a colonel and as a public relations officer for the Ninth U. S. Air Force.

# D. L. Prouty Elected President At 14th Vermiculite Institute Convention

DAYTON L. PROUTY of Dearborn, Mich., vice-president of Zonolite Company, was elected president of Vermiculite Institute of Chicago at the group's 14th annual convention, held April 2 through 7 at the Lago Mar Hotel at Fort Lauderdale, Fla. He succeeds Lorne G. McDiarmaid of Vancouver, B. C., vice-president of Insulation Industries, Ltd.

Charles Goyer of Montreal and C. H. Wendel of Los Angeles were named to the board of directors. W. J. Bein, vice-president of Zonolite, was re-elected treasurer. Edward R. Murphy of Chicago was returned as managing director.

An attendance of 80 members and guests made this the largest and fastest-paced meeting in the institute's history. Guest speakers included the following: Clair W. Ditchy, president, American Institute of Architects; Stanley Smith, president, Concrete Construction Company, Columbia, S. C.; E. F. Venzie, president, National Bureau for Lathing and Plastering; and Theodore Riedeberg, New York, N. Y., agrichemical expert and consultant to the vermiculite industry on the agricultural uses of the mineral.

One entire day of the sessions was devoted to discussions of concrete. Stanley Smith, whose firm has been installing vermiculite concrete roof decks for the last two years, described a new pump he has developed which can cover 1,500 to 1,800 sq. ft. per hour with a 2-in. thickness. The cost of pumping vermiculite concrete is less than for other handling methods. The concrete also screeds very well.

Predicting a bright future for insulating concrete roof decks, he said, "One of the most important things we have to sell, besides fireproofing and light weight, is insulation. Due to air conditioning, insulation is becoming increasingly essential, and a great many architects are more conscious of the value of an insulated roof deck today than they have ever been before."

"Quality workmanship and reliability in doing what you say you're going to do will increase sales faster than anything else you can do," he asserted. "In several cases we have been given work on which we were not low bidder, simply because of past performance."

Also of interest in the concrete discussion was a pitched roof of vermiculite concrete installed on three Memphis homes, described by C. R. Babb of St. Louis. This deck was installed at a saving of 20 cents per square foot, compared with the conventional roof.

L. K. Irvine of Salt Lake City, Utah, reported on the new First Security Building under construction there—one of the first multi-story structures to take advantage of the 5-hour fire rating recently issued to machine-applied vermiculite concrete spandrel wall construction. Although this is primarily only a 12-story building and relatively small, the space-saving with this thinner type of wall construction represents $16,000 in annual rentals for the owner, Mr. Irvine said.

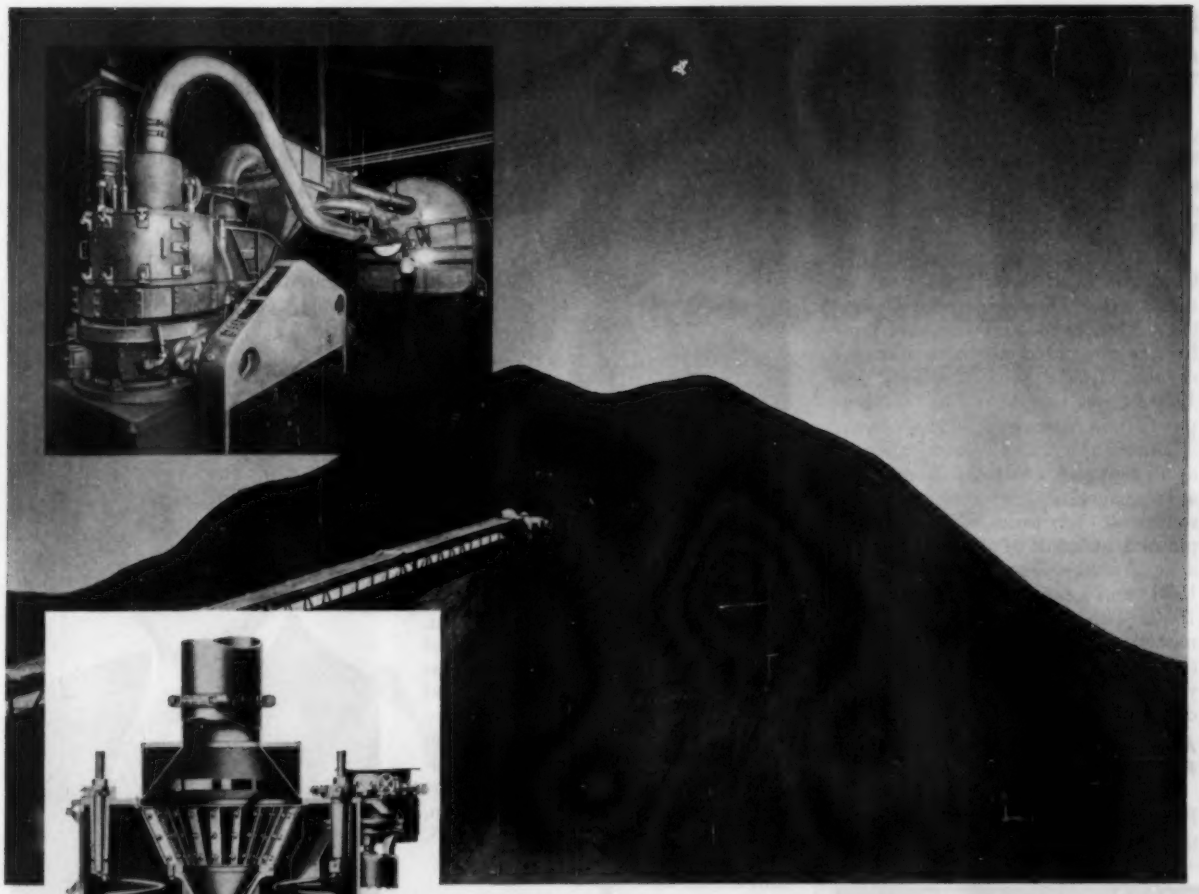
E. F. Venzie discussed lightweight aggregates and asserted that they offer tremendous possibilities to the plastering industry in finishes, soundproofing, exterior lightweight walls, and many other ways now being developed.

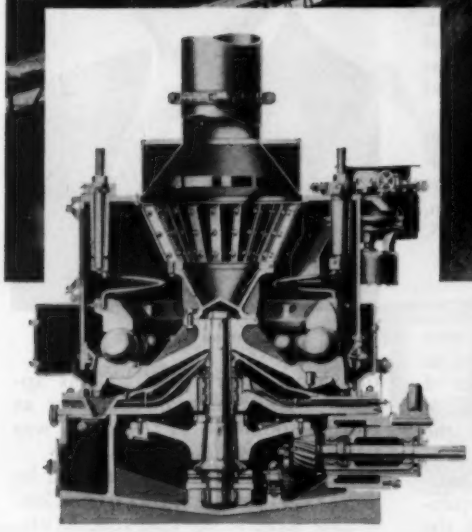
Dayton L. Prouty, president-elect, Vermiculite Institute of Chicago.

Discussing the impact of the machine age on the plastering craft, C. H. Wendel stated that southern California, which has the greatest concentration of machines for applying lightweight plaster, also has the greatest labor shortage in the plastering industry. This is an indication that mechanization is providing more jobs for the journeyman.

Clair W. Ditchy discussed the future of building construction and predicted that houses will be better and cheaper. He added that marked improvement will come about through mass production.

Some of the members and guests of the Vermiculite Institute who attended the organization's five-day convention in Fort Lauderdale, Fla.





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2. No internal adjustments are required.
3. Grinding elements are made of wear-resistant, long-life metals, with grinding balls held to close spherical tolerances.
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BOILER DIVISION

C-212

## R. S. Stevenson Elected Allis-Chalmers President To Succeed W. A. Roberts

Robert S. Stevenson, executive vice-president of the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., since 1952, has been elected president, to succeed the late William A. Roberts.

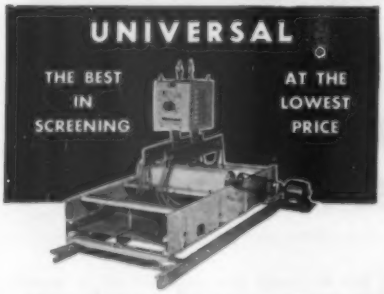
Mr. Stevenson started with Allis-Chalmers in 1933 as a salesman in the Tractor Division at the Kansas City, Mo., branch. Two years later he was appointed assistant manager of the Omaha, Nebr., branch; in 1936 he was transferred to the company's home office in Milwaukee.

During the next 12 years he served as an assistant territory manager and as manager of the northwest and southwest territories. He was appointed assistant general sales manager for the Tractor Division in 1938, and general sales manager in 1950. The following year he was named vice-president in charge of the Tractor Division. Later that year he was elected to the board of directors.

### American Financing Sought For Pakistan Cement Plant

Pakistan Builders, Ltd., Karachi, Pakistan, has invited American firms to help finance a proposed cement plant to be established near Karachi.

The plant will have a capacity of 200,000 tons annually. Management participation up to 50 percent and profit-sharing rights are offered to the investor. Additional information concerning this opportunity is available for review on loan from the Commercial Intelligence Division, Bureau of Foreign Commerce, U. S. Department of Commerce, Washington, 25, D. C.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L. J. Boucher

A change of ownership has been published for the Gray Quarries at Hamilton, Ill. Mrs. Dolly Miller of Elvaston, Ill., and John Pyles of Quincy, Ill., have purchased the quarries from Rayburn Gray. The new firm, to be known as Gray Quarries, Inc., has purchased the equipment and business and leased the land.

## *Cover Picture....*

● The cover picture this month is an aerial view of the New York Trap Rock Corporation's plant near Haverstraw, N. Y. Note how quarrying is carried on without marring the scenic beauty of the famous Hudson River Palisades. An article in this issue describes the new crushing and conveying installation (foreground) which is on the same level as the third level now being opened.

## Smith Succeeds Boucher In Universal Atlas Post At Northampton, Pa., Plant

L. J. Boucher, plant manager of the Northampton, Pa., operation of the Universal Atlas Cement Company, has retired after 39 years' service with the firm. Raymond W. Smith, assistant plant manager of the Northampton plant, has been appointed to succeed him.

Mr. Boucher joined Universal Atlas in 1915, working in the Hannibal, Mo., quarry until he was appointed assistant plant manager at Northampton in 1927. He was named plant manager in 1947.

Raymond W. Smith

In an announcement released by John G. Hoad and Associates, Consulting Engineers, Ypsilanti, Mich., it was revealed that Mr. Boucher is to be this firm's consultant on cement mill work. This assignment will include selection of equipment, general arrangement of facilities, preparation of detail plans and specifications, and supervision of construction for new mills and for plant expansion and improvement.

Mr. Smith worked for the Western Electric Company and Bethlehem Shipbuilding Company before he joined Universal Atlas in 1921. Four years later he was made an engineer and foreman. He became assistant general operating foreman in 1945 and assistant plant manager in 1947.

The F. S. Neely Company, Fort Smith, Ark., has begun working an open gypsum mine near Cooleyville, Ark. The operation will employ between 7 and 10 workers.

# Make sure the screw conveyors you buy pass this quality test!

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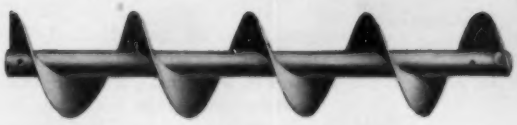
**1. Is flighting accurately formed?**



Link-Belt's specialized machinery assures accurate forming, producing uniformity of flighting curvature.

**2. Are diameters uniform?**

Only specially selected steels are used to meet Link-Belt's rigid specifications.

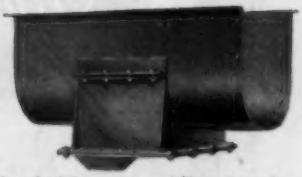
**3. Will the hangers match your exact needs?**

Hangers are available in gray iron or steel frames in a range of styles and with various bearing materials.

**4. Will installation be easy?**

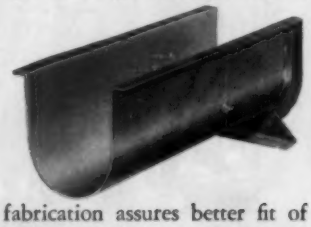
Straightness is checked before shipping, and extra care is taken in handling and loading. Jig-drilled coupling bolt holes facilitate assembly.

**5. Can gates be installed on the job?**



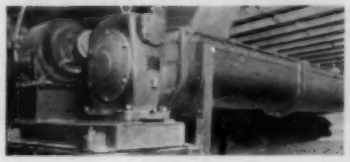
Gates are available for bolting or welding in place right on the job for ease of trough opening location.

**6. Are troughs fabricated to your specifications?**



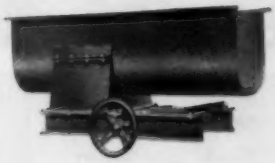
Link-Belt's accurate fabrication assures better fit of all components. Choice of metals to fit your need.

**7. Is the drive fully integrated?**



Only Link-Belt builds a complete line of gear and chain drives, couplings, bearings, shafting.

**8. How wide a choice of spouts and gates do you have?**



Discharge spouts and gates can be fixed or detachable. Hand or rack-and-pinion, flat or curved slide gates.

**9. Is full ordering information readily available?**

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### Shoals, Ind., Tracts Leased For Exploratory Drilling By Lehigh Portland Cement

Leases on land in Indiana totalling about 435 acres have been acquired by the Lehigh Cement Company in recent months. Test-hole drilling was scheduled to begin at once on the optioned land.

It was stated that the land in the vicinity of Shoals contains shale, gypsum, limestone, and iron oxide—all used in manufacturing cement. Records show that about 50 years ago an iron mine was in operation beneath one of the tracts.

According to C. E. Eichelberger, manager of the Mitchell, Ind., Lehigh plant, the cement firm's activities in the Shoals area are still in the exploratory stage, and that there are no definite plans for mining or installing processing facilities there.

### American Cement Companies Ship 274,096,000 Bbl. in 1954

Total shipments of finished portland cement in the United States and Puerto Rico during 1954 amounted to 274,096,000 bbl., valued at $757,570,000, and averaging $2.76 per bbl. Of the total shipments, 10,147,000 bbl. were high-early-strength cement, valued at $31,755,000.

The percentage of estimated annual capacity used in the 12-month period ending January 31 was 93, the same as the figure for the comparable period ending Jan. 31, 1954.

### ● Correction

One of the feature articles of the April, 1955, issue of PIT AND QUARRY described the new crushing and screening plant of the Minnesota Mining and Manufacturing Company near Wausau, Wis. This ultra-modern operation supplies crushed and sized argillite for the company's roofing granules plant in Wausau. A general view of this plant on the front cover of that issue was erroneously titled the "quartzite" crushing and screening plant. Actually, as the article states, the company at one time did use quartzite for its granules, but found argillite much more suitable and has been using it since 1937.

---

Cement firms which have recently announced a 10-cent increase in price on cement shipped in paper bags include Penn-Dixie Cement Corporation, Lehigh Portland Cement Company, Alpha Portland Cement Corporation, Lone Star Cement Corporation, and Dragon Cement Company.

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New VHS is made of tougher, more wear-resistant wire. This pays off in longer service under the gruelling conditions that slusher ropes, drag lines and shovel hoist ropes encounter.

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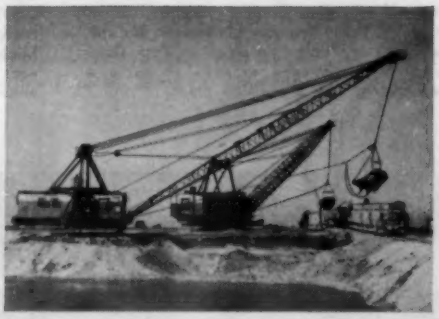
Tougher, more wear-resistant VHS means longer life for your slusher ropes, drag lines, shovel hoist ropes. It cuts the "down time" necessary for rope replacement on this vital equipment—saves you money.



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## Michigan Limestone Div. Opens Port Dolomite, Mich. To Serve New Quarry, Plant

The self-unloading steamer *Calcite*, operated by the United States Steel Corporation's Michigan Limestone Division, opened Port Dolomite, Mich., newest raw material port on the Great Lakes, on April 16. Carrying the first cargo of high-grade dolomite limestone from the division's new Cedarville quarry in upper Michigan, the *Calcite* headed for Cleveland.

Port Dolomite was constructed by the Michigan Limestone Division to become the shipping point for the Cedarville dolomite limestone quarry, which began full scale production in April. This new facility, located near the town of Cedarville, is about 35 miles south of Sault Ste. Marie.

Port Dolomite facilities include secondary and tertiary crushers and a screening plant. Stone is simultaneously processed into eight washed grades or sizes, all of which can be varied. The equipment has a rated capacity of 1,800 t.p.h.

In announcing the opening of the new port, C. F. Beukema, president of the Michigan Limestone Division, said that the *Calcite* was selected to carry the first cargo because she was the first self-unloader in the Bradley Transportation Line to be operated by this U. S. Steel division.

Construction of Port Dolomite and the Cedarville quarry was begun in April, 1953, and initial production of dolomite was scheduled for this spring. The Cedarville quarry has an annual rated production capacity of approximately 3,000,000 tons.

"The Cedarville Quarry was opened to supplement the high-calcium limestone production of our Calcite quarry near Rogers City," Mr. Beukema said. "By blending the high-calcium stone from Calcite with the high-magnesium stone from Cedarville to certain specifications, we are able to produce superior metallurgical and chemical grades of limestone in the complete range from highest calcium content to highest magnesium content."

Limestone from the new quarry approximates 45 percent magnesium carbonate and 55 percent calcium carbonate. The deposit lies near the surface, with little overburden. Mr. Beukema also pointed out that the hardness, toughness, and soundness of the Cedarville stone makes it ideal as an aggregate for highway and other concrete and bituminous construction work.

Facilities at the quarry include a primary crusher which was erected on the floor of the quarry, some 40 ft. below the surface. Stone is hauled from the quarry to Port Dolomite over a new railroad extending more than five miles across swampland and rugged terrain.

The dock at Port Dolomite is 620 ft. long and 117 ft. wide and is located on the edge of a natural deep-water channel leading into Lake Huron. A traveling loading shuttle moves along the length of the dock so that freighters can remain stationary while receiving the load. This shortens the loading time to about five hours.

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The Stewart Sand & Material Company has purchased the building at 4049 West Fortieth Street, Kansas City, Mo., for its new offices.

## Thomas S. Holden Predicts 1955 Construction Volume Will Maintain Rising Trend

The probability that 1955 will be the eleventh consecutive year of construction volume increase should not be considered surprising in view of the rapid expansion of the nation's economy in recent years, according to Thomas S. Holden, vice-chairman of F. W. Dodge Corporation.

"As a matter of fact, recent construction volumes have barely kept pace with the growth of the economy," Mr. Holden said. "Last year's record total was only 28 percent over the peak volume of the boom of the 1920's . . .

"Since the big boom of the 1920's, population has increased 35 percent, per capita incomes increased nearly 50 percent, and total output of goods and services more than doubled. During the 1920's population increased 1,700,000 annually, while last year's increment was 2,800,000 persons. Economic growth is the great generator of construction demand."

Referring to Dodge's published estimate early last November that 1955 would show a 6 percent gain over 1954 in the Dodge totals, Mr. Holden said it seems now that the estimate will be exceeded. In regard to the current contention that residential building has been moving ahead too fast, Mr. Holden stated that no strong case has been made to support that opinion.

As to commercial building, Mr. Holden believes that such construction could conceivably be overproduced on a speculative basis, but that he can see no evidence of such overproduction.

The self-unloading steamer "Calcite," operated by the Michigan Limestone Division, pulling away from the dock at Port Dolomite, Mich., opened recently to serve a new quarry and processing plant.

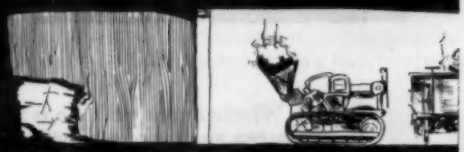
Dolomite being dumped from a 30-ton mine truck into a gyratory primary crusher at the Michigan Limestone Division's new quarry near Cedarville, Mich. The quarry has an annual capacity of 3,000,000 tons.

A scene in the Cedarville quarry. Dolomite is being loaded into trucks by a 10-cu. yd. electric shovel. The trucks carry the stone to a primary crusher on the quarry floor, 40 ft. below the surface.

# How tough is an Eimco

Breaking in the bulkhead to the open hearth furnace.

Using a crowbar type action to pry out the semi-consolidated molten mass.



Carrying 5 to 7 ton pieces to the gondola.

**"That's the only loading machine that can stand up on this job," says an open hearth superintendent watching his Eimco 105 Tractor Excavator digging in a slag pocket.**

**Dozens of Eimcos are now working in steel mills digging out the molten slag in furnace repair work on the slag pockets in open hearth furnaces.**

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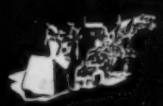
MODEL 12B

MODEL 21



MODEL 40H

MODEL 630

105 BULLDOZER

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YUBA-built conveyors range in size from very short to mile-long systems capable of transporting 17,000 tons daily. Designs are based on half century of experience building heavy-duty conveyors for placer dredges, aggregate producers and contractors.

## Trouble-Saving Head Pulley

By using a YUBA-SCHROCK head pulley, the pulley with the motor inside, you save space, cut maintenance costs and avoid conveyor downtime. All the drive mechanism fits compactly inside the pulley shell, protected from weather and dirt. There are no chains, belts or sprockets to service, replace or endanger personnel. Sizes to 125 hp. for inclusion in new conveyors or for modernizing old conveyors.

Bring your hard-to-solve materials handling problems to YUBA. Let our knowledge help you work your property most profitably. For recommendations and estimates, call, wire or write YUBA Today.

81

**Dredges • Hoists • Winches • Drums • Screens**
**Jigs • Hoppers • Bins • Drives and Shafting**
**Expansion Joints • Built-to-order Machinery**

**YUBA MANUFACTURING CO.**

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## Holmes Safety Association Now Natl. Organization—Forbes Elected President

Organization of the Holmes Safety Association on a national basis for the first time has resulted from an intensive drive begun in April, 1954, to increase co-operation for mine safety, J. J. Forbes, director of the Bureau of Mines and president of the association, has announced.

The association, established in 1926 to promote co-operation for mine safety among state and federal mining agencies and mine management and labor, has previously operated only on a local and district basis. However, during the past year 17 new district councils and 197 local chapters have been organized. As a result of this increased interest, the association has established a national council.

Growth of the association can be of great value in the fight for mine safety, according to Mr. Forbes, because experience has shown that wherever chapters and councils have been formed and remained active, there has been a downward trend in accidents. The association now has chapters and district councils active in Alabama, Arkansas, Colorado, Kentucky, Louisiana, New Mexico, Pennsylvania, Tennessee, Utah, Virginia, West Virginia, and Wyoming.

Officers of the new national council were elected at a meeting of the association held in Washington, D. C., on April 26. They are as follows:

**President**—J. J. Forbes, who is *ex officio* president of both the Holmes Safety Association and its parent organization, the Joseph A. Holmes Safety Association. (Mr. Forbes automatically became president of the council in accordance with the by-laws of the Holmes Safety Association.)

**First vice-president**—S. A. Magistrella, federal coal mine inspector and president of the Indiana Council of the association, Indiana, Pa.

**Second vice-president** — L. J. Pnakovich, assistant to the president of District 31, United Mine Workers of America, Fairmont, W. Va.

**Third vice-president** — Julius Olzer, acting chief of the West Virginia Department of Mines, Charleston, W. Va.

**Secretary-treasurer** — William Rachunis, Bureau of Mines mine safety representative, Washington, D. C.

---

CARROLL NORDEEN has been appointed sales manager for the Arkansas district of Ideal Cement.

**The 'Jeep' Truck** goes anywhere you need to go in a quarry operation. It travels on the highway in conventional 2-wheel drive, but shifts easily into 4-wheel drive for tough going or off-road transportation of workers, repair parts or supplies — or delivering drill bits to a blast hole drill.

# How 4-wheel drive cuts quarry maintenance costs!

**The Universal 'Jeep'**, with power take-off, operates a mobile drill for test borings. It carries men and equipment anywhere around the quarry, and travels speedily between jobs.

**With power take-off,** the rugged 4-wheel drive 'Jeep' Truck operates many different types of equipment, including mobile cranes for moving heavy concrete pipe.

Vehicles in the 4-wheel drive 'Jeep' family provide communications and supply links that keep quarry maintenance and service running smoothly. Carrying men, materials or both, they go where other vehicles can't go and do many of your jobs faster and more economically than heavier, more expensive vehicles.

Start now to cut your maintenance costs. Get the facts on the 'Jeep' family of 4-wheel drive vehicles. See your nearest Willys dealer for a demonstration or write for information.

### *How does 4-wheel drive work?*

4-wheel drive vehicles offer *selective* 2- or 4-wheel operation. In 4-wheel drive, the engine power is transmitted to all four wheels at once, rather than to the rear wheels alone, thus, utilizing the entire weight of the vehicle for maximum traction. A special low-gear range provides extra pulling power, when needed.

*The* **'Jeep'®**

***Family of 4-wheel drive vehicles***

**WILLYS...makers of the world's most useful vehicles**

WILLYS MOTORS, INC., TOLEDO 1, OHIO

# 30 years ago in Pit and Quarry

BY WALTER E. TRAUFFER

THE June 1, 1925, issue of PIT AND QUARRY was not a special number, but the lime industry received considerable attention. Featured was a detailed report of the seventh annual convention of the National Lime Association, held May 26 to 29, 1925, at the Briarcliff Lodge, Briarcliff Manor, N. Y. This was a serious affair, and meetings were held in the evenings as well as in the daytime. The program was varied, offering something of interest to technical men, chemists, and superintendents; the usual business matters were also transacted. Charles Warner (Warner Company, Philadelphia) was elected president, to succeed George B. Wood. J. J. Urschel was the new vice-president.

Speakers included Burton A. Ford, general manager of N.L.A.; J. W. Stockett, assistant chemical engineer; G. J. Fink, chemical director; R. C. Towles, soil technologist; R. P. Brown, construction engineer; and G. B. Arthur, central division manager, all of N.L.A.

A paper by Victor J. Azbe, combustion engineer, on kiln performance, was reprinted in full in this and the following issue. *Lime in Dirt Roads* was the subject of E. J. McCaustland, dean of the University of Missouri. A special article was entitled *Concerning Waste Heat Recovery from Rotary Lime Kilns.* The United States Gypsum Company's new kiln near Cordova, Ill., was also described. It had eight vertical kilns, rated at 12 tons per day each, and two batch-type hydrators.

The June 1 issue had the first of a series of articles on *Blasting Practice in Quarry and Open Pit Mining* by R. N. Van Winkle. The June 15 issue had a special article on *Heavy Digging Revolving Quarry Shovels* by G. B. Massey. This issue also carried the announcement of the launching by *Explosives Engineer Magazine* of its national safety competition under the auspices of the U. S. Bureau of Mines. The winning mines and quarries were to receive the now well-known "Sentinels of Safety" trophies.

Other plant articles in these issues included the Pacific Limestone Products Company near Santa Cruz, Calif., which produced 17 types of limestone products for purposes ranging from chicken grits to concrete brick manufacture. The A. E. Sheltraw sand and gravel plant at Lansing, Mich., was a hydraulic dredging operation. The Stamford Local Materials Company, Stamford, Conn., operated a combination sand and gravel and crushed gravel plant, using one deposit which met all ordinary demands and a second full of coarse gravel which was used when there was a heavy demand for crushed gravel. The Ball Benton Gravel Company at Benton, Ark., was one of the largest, with a daily capacity of 3,000 tons. The General Concrete Products Corporation had just completed a modern sand and gravel plant with a slackline cableway excavator.

The Rock Cut Stone Company operated a 3,500-ton-per-day crushed stone plant near Syracuse, N. Y., which was a hillside operation using gravity to the fullest extent. Also described was the plant of the Erwin Feldspar Company at Erwin, Tenn.

## Most U.S. Cement Companies Show Higher Sales, Gains

Ideal Cement Company disclosed record profits for the year ended December 31, 1954. For that period Ideal's net profit was $11,095,869, or $3.37 a share, compared with $7,525,077, or $2.34 a share, for 1953. Sales and revenues increased to $59,555,894 from $53,989,434.

Substantially increased sales and net income were also reported during 1954 by the Marquette Cement Manufacturing Company. Receipts amounted to $37,751,286 against $30,285,915 for 1953. Net income for the year just past was $5,121,049, equal to $5.19 per share, compared with $3,831,917, or $4.28 per share, in 1953.

Net income of the Hercules Cement Corporation last year more than doubled that for 1953. After taxes, net income for 1954 totaled $1,483,194, equal to $7.31 a share. This compares with $665,638, or $3.28 a share, earned the year before.

Canada Cement Company, Ltd., and subsidiaries reported for the fiscal year ended November 30, 1954, a net profit of $6,350,147, equal to $8.55 per common share, as compared with a net profit of $6,325,000, equal to $6.97 per common share, for the fiscal year 1953.

Penn-Dixie Cement Corporation's net income in 1954 was 45 percent higher than the previous year. Net income last year amounted to $4,854,085 or $6.72 a share, as compared with a net income of $3,354,549, equal to $5.57 a share in 1953. Sales in 1954 totaled $30,745,545, against sales of $27,922,013 for 1953.

Net earnings of the General Portland Cement Company for 1954 amounted to $6,833,256 after taxes, as compared with $5,226,454 for the previous year. Net sales during 1954 were $33,443,661, a gain of 9 percent over sales of $30,487,316 for the previous year.

Consolidated Cement Corporation reported net earnings of $1,022,867 after taxes in 1954, an increase of 31 percent over the preceding year's earnings of $779,489. Net sales in 1954 were $6,275,703, compared with $5,911,161 the year before.

A net income of $12,502,274 or $4.33 a share for 1954 was reported by the Lone Star Cement Corporation. Sales amounted to $84,439,763. In 1953 a net income of $9,318,534 or $3.27 a share was earned, and sales amounted to $78,654,292.


**PIT AND QUARRY**

**HAS AN OPENING ON ITS EDITORIAL STAFF**

**Prefer man with experience in these industries, engineering education and training. Must have writing ability, moderate amount of traveling, should have car. Salary commensurate with ability and experience. Permanent position.**

***Write to Editor***

**PIT AND QUARRY PUBLICATIONS**

**431 S. Dearborn St. Chicago 5, Ill.**

## ROEBLING ANNOUNCES ITS NEW

# Royal 1105 Blue

## WIRE ROPE . . . 15% STRONGER THAN YESTERDAY'S GUARANTEED STRONGEST!

15% MORE STRENGTH is a whopping improvement. But translate that extra strength into terms of increased service life and you've really got something to brag about.

★ What's more, Roebling is pulling no punches on the variety of this new rope that will soon be available. You'll be able to get **ROYAL BLUE** Wire Rope in EVERY DIAMETER from ¼" to 3½"... in EVERY STANDARD CONSTRUCTION with an independent wire rope core.

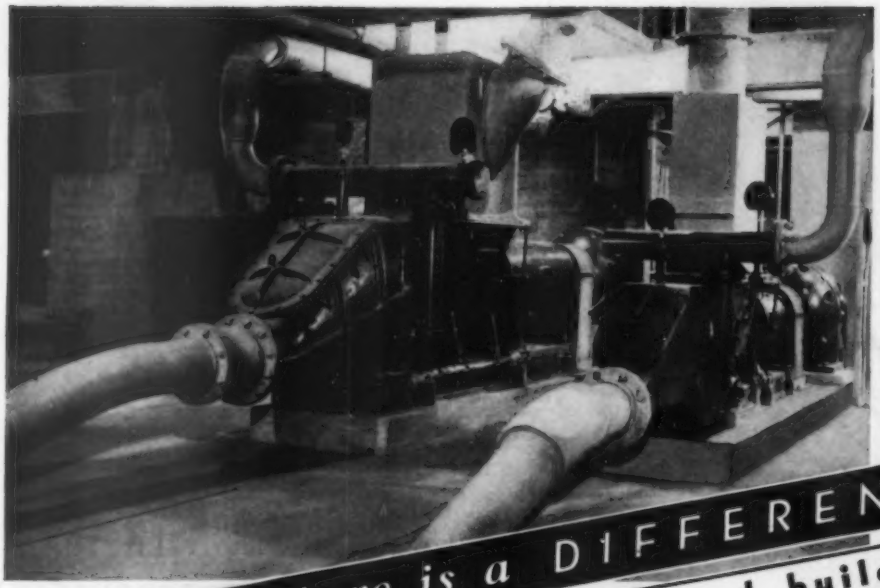
★ In addition to new high strength, Roebling type 1105 wire — the finest high carbon rope wire ever produced — gives **ROYAL BLUE** Wire Rope amazing toughness and resistance to impact, crushing, abrasion and fatigue.

★ As the first step toward completely new service economy, write us for the whole story on **ROYAL BLUE** Wire Rope, or contact your distributor or nearest Roebling branch office.

# ROEBLING

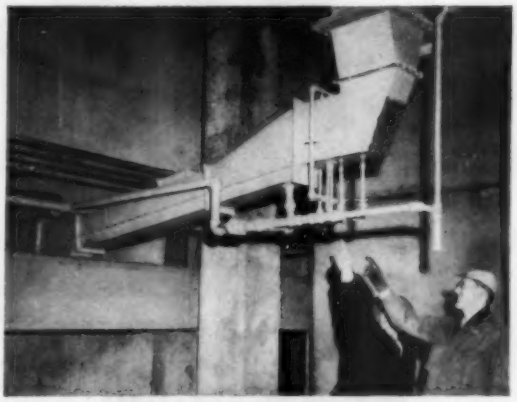
*Subsidiary of The Colorado Fuel and Iron Corporation*

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 81 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1930 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.



Fuller-Kinyon System conveying finished Portland cement and cement raw materials from pulverizers to storage.

# There is a DIFFERENCE when Fuller designs and builds your conveying system



F-H Airslides conveying Portland cement from silos to a screw conveyor.

Fuller is not restricted to one design and construction, but is able to select and apply the right system for conveying dry, pulverized and granular materials most efficiently and economically . . . because, selection can be made from four types, or combinations, to meet requirements—materials to be handled, capacity desired, distance of travel, and overall characteristics of the plant layout. In other words, each job is given individual attention and study before equipment and design is selected and recommended.

Add to this, Fuller's over a quarter of a century of experience in the field of pneumatic conveying, and you have something that is hard to beat. It is something that is difficult, if not impossible, to write into specifications or show on blueprints, yet is inherent in Fuller engineering and equipment.

Fuller conveying systems can be installed, in most cases, with no interruption of production. Why not have us make a study of your conveying problems, with no cost or obligation. Our findings and recommendations may give you an entirely new concept of conveying.

Write for Bulletin G-1, describing Fuller Conveying Systems.

**FULLER COMPANY, Catasauqua, Pa.**

GENERAL AMERICAN TRANSPORTATION CORPORATION SUBSIDIARY

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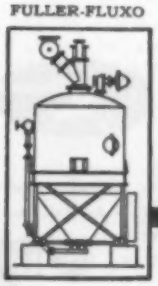
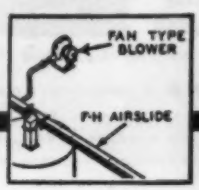


FULLER-KINYON

AIRVEYOR

F-H AIRSLIDE




G-112
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**Fuller**

. . . pioneers in harnessing AIR

# LOAD..MOVE..and FILL at LOWER COST

## with Firestone NYLON TIRES

FIRESTONE Nylon Off-The-Highway Tires are built to move more loads at lower cost. For any tough operation . . . earth moving, strip mining or rock work, Firestone has a nylon tire that will cut downtime and maintenance costs and keep men and equipment on the job.

It costs you less to run on Firestone Nylon Tires because the treads give maximum traction and they are extra tough to resist cutting. The sidewalls are double thick to give added protection against cuts and snags. The new Firestone Safety-Tensioned Gum-Dipped* nylon cord body gives the greatest protection against impact breaks . . . flex breaks . . . heat failures . . . and water damage.

Your Firestone Dealer or Store can show you how Firestone Nylon Tires will cut your tire costs.

*T.M. Reg. U.S. Pat. Off.

**A TIRE FOR EVERY ROAD, LOAD AND CONDITION OF SERVICE**

GROUND GRIP • ROCK GRIP • TRACTION ROCK • ALL NON-SKID • ALL TRACTION • RIB EXCAVATOR

**When you buy new equipment or replacement tires, specify Firestone**

*Enjoy the Voice of Firestone on radio or television every Monday evening over ABC*

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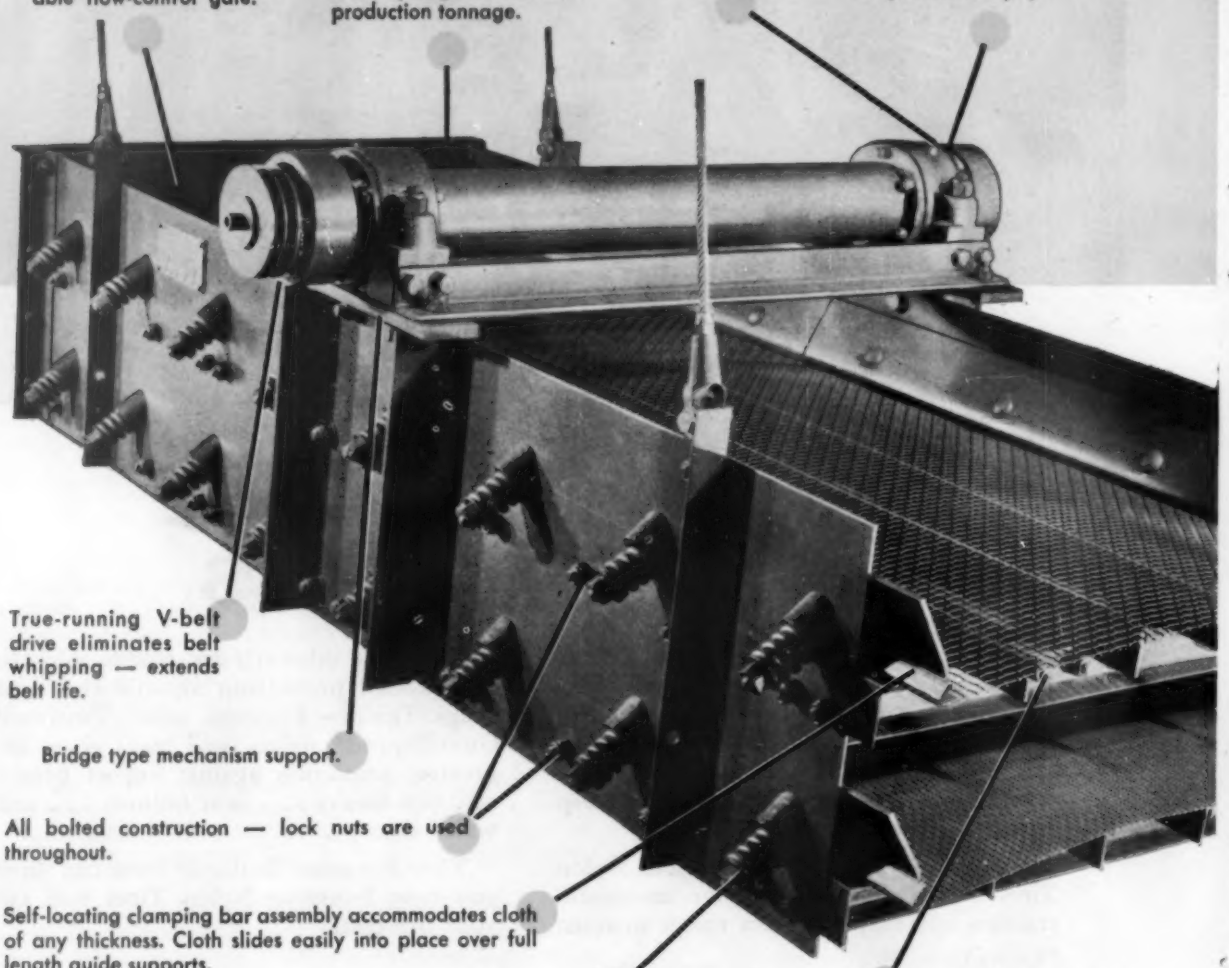
# A NEW High

Feed box (optional) protects screen surface by absorbing impact of incoming material. These screens can also be equipped with an adjustable flow-control gate.

Back plate is standard. It adds rigidity — converts spillage to extra production tonnage.

Advanced method of lubrication—surer, safer.

Simplified vibrating mechanism can be replaced in a jiffy.



True-running V-belt drive eliminates belt whipping — extends belt life.

Bridge type mechanism support.

All bolted construction — lock nuts are used throughout.

Self-locating clamping bar assembly accommodates cloth of any thickness. Cloth slides easily into place over full length guide supports.

Springs prevent whipping and breakage of screen cloth.

Full length rubber buffer strips are replaceable. Cushioning of cloth means longer screen cloth life.

## New Bulletin

In addition to telling the complete story of this new high quality *Aero-Vibe* screen, bulletin 07B6099A provides handy information on how to select type and size of vibrating screen. Get your copy from your nearby Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.

*Aero-Vibe* is an Allis-Chalmers trademark.

**ALLIS-**

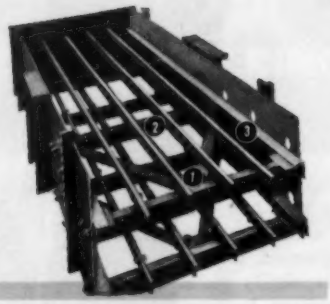
# Quality SCREEN AT A NEW Low Cost

WHEN you put one of these new high quality *Aero-Vibe* screens on the job, savings start with a low initial cost—and they continue throughout the screen's long, long life.

Now, aggregate producers, small and large, can profit from the top screening efficiency and steady, low cost production made possible by the newest and best in vibrating screen design. A-4775

Model AVS handles feed up to 4 inches (coal up to 6 inches).

Proper spacing of clamping bar bolts and correct camber provide added life to screen cloth.



**STURDY FRAME**

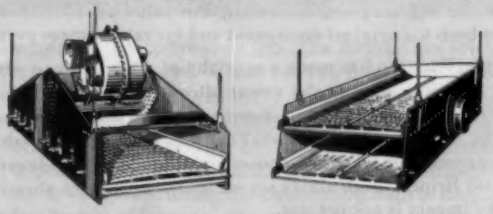
**1** Rigid, X-frame construction

**2** Heavy channels

**3** Replaceable steel cross members

**ENGINEERING HELP**

Whether you are establishing a new operation or revising an old set-up, you can get as much help as you want or need from Allis-Chalmers . . . a company with over 75 years of experience in designing, building and applying reduction and classification equipment for your industry.



No matter what the screening problem, there is an Allis-Chalmers vibrating screen designed to meet your specific needs.

**CHALMERS** A-C ALLIS-CHALMERS

Birdsboro-Buchanan Jaw Crusher

# TISCO® helps Birdsboro-Buchanan Crushers

## *get more production without interruption*

Jaw plates of TISCO Manganese Steel are used in Birdsboro-Buchanan Crushers because of the extraordinary property of this material of developing an extremely hard, abrasion-resistant surface in use under impact. This assures greater production with less down-time for replacement, indicating the value of TISCO Manganese Steel both for original equipment and for replacement parts.

Taylor-Wharton has made a specialty of alloy steels to resist impact and abrasion. Among the newer alloys developed by this company are TISCO 150-Y, a high chrome cast iron that can be heat treated to 700 Brinell, and TISCO 50. The latter is a heat hardenable medium manganese chrome molybdenum steel capable of hardness from 300 to 500 Brinell. Both alloys are strongly resistant to abrasion, where heavy impact is not present.

If your problem is one of impact or abrasion, or a combination of both, get in touch with us. When ordering replacement wear parts, order from manufacturer of the equipment and specify TISCO Alloys.

TISCO Manganese Steel Jaw Plates Assembled on a Swing Jaw for Birdsboro - Buchanan Jaw Crusher

**Use TIMANG Weld Rods and Shapes for rebuilding and repairing wear parts.**

## TAYLOR-WHARTON Iron and Steel Co.

(Division of HARRISBURG STEEL CORPORATION)

**HIGH BRIDGE 3, NEW JERSEY**

Cincinnati, O. Birmingham, Ala. Easton, Pa.

# THE BIGGER THE JOB THE MORE YOU SAVE

**BARBER-GREENE**

**MODEL 76**

**PERMANENT BELT CONVEYORS**

**SAVE SELECTION ENGINEERING ERECTION TIME ... AND MONEY**

Barber-Greene Conveyors are made of pre-engineered, self-contained, *standardized* units that are quickly assembled without costly engineering time. Field assembly of miscellaneous pulleys, bearings and dozens of other parts is completely eliminated. B-G Conveyors are as easily disassembled, expanded or relocated—with 100% salvage. The value of these B-G features is in direct proportion to the size and scope of the conveying job. The bigger the job—the more you will save. Wherever you have bulk handling problems—or are planning to modernize or expand present facilities—investigate Barber-Greene Conveyors. Take advantage of Barber-Greene's extensive experience in solving problems of bulk handling similar to your own. Complete descriptive data is available for handy reference—it's yours for the asking.

**Barber-Greene** BG

*Aurora, Illinois, U.S.A.*

**"Torture-Testing" Builds Axles** that can take it. In our indoor proving ground, we have concentrated every hazard of a million miles of driving. TDA axles prove themselves against tests like this one . . . where an axle shaft is twisted 14° backwards and forwards, 36 times a minute, for months on end. Other tests simulate a 3,000 mile uphill haul with a full load. Only tests this rugged could produce axles this serviceable.

# HEAVY LOADS ARE PAYLOADS

## ...and exclusive Timken Inter-Axle cab controlled lockout at any speed!

**Every heavy trucker has *two* big problems to lick. First, to deliver *more payload* faster. Second, to get the *most service* out of his equipment . . . with less maintenance costs, less downtime.**

Timken-Detroit has spent 37 years developing the most helpful answer to heavy hauling! The TDA Tandem Drive Rear Axle Unit! The lightest, strongest, most serviceable unit of its kind ever produced.

Engineering is the keynote of TDA Tandem superiority. Unlike ordinary tandems, in TDA Straight Line Drive, propeller shafts form an absolutely straight line from the forward rear axle back to the rearmost axle. This permits smoother transmission of power, no noisy *around the corner operation.*

Other TDA Tandem design advantages give you longer trouble-free service, quieter, more economical performance, bigger savings on man and equipment time. Maintenance is easier, too. TDA design allows almost complete interchangeability of parts between four and six-wheelers. Solid benefits explain why TDA is the choice of manufacturers and operators everywhere.

**How TDA Inter-Axle Differential cuts truck and tire wear! With cab-controlled lockout!**

When tandem tires are mismatched...or when tandem trucks are going over rough grades . . . one set of wheels must turn faster than the other or be dragged. TDA Inter-Axle Differential permits either wheel to do this when necessary. Also, with TDA, the driver can, when necessary, lock out the differential and obtain a straight-through drive in mud or sand.

**THREE TYPES:** Hypoid-helical double-reduction, optional inter-axle differential. Worm drive, without inter-axle differential.

*For six-wheeler operation . . .*

## THE TDA TANDEM DRIVE REAR AXLE UNIT

**Now—the *world's finest* tandem drive rear unit for heavy-duty motor trucks!**

And with these features, developed, introduced and pioneered by TDA: (1) Available in 3 types of final drives and 3 capacities. (2) Top-mounted straight-line final drive eliminates propeller shaft angularity. (3) Optional inter-axle differential . . . spur gear design, cab-controlled power-lockout. (4) Torsion flow axle shafts . . . guaranteed for 100,000 miles or three years, whichever occurs first. (5) Hot forged steel axle housing . . . guaranteed for the life of the vehicle. (6) Unit-mounted "P" series power brakes . . . for longer life, greater economy and efficiency. (7) Cradle ride spring suspension and paralleled torque rod system . . . maintain correct alignment and weight distribution regardless of driving and braking conditions. (8) Exclusive two-piece trunnion tube bracket speed servicing. (9) Removable torque rod and spring guide brackets . . . for positive alignment, easier replacement. (10) Rubber torque rod bushings and rubber spring seat bushings . . . eliminate metal-to-metal contact. Require no lubrication.

# WITH TDA TANDEMS

## *Differential that permits*

TIMKEN *Detroit* AXLES

TIMKEN-DETROIT AXLE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
DETROIT 32, MICHIGAN

*Accepted* TDA *Standard*
TRADE MARK REGISTERED

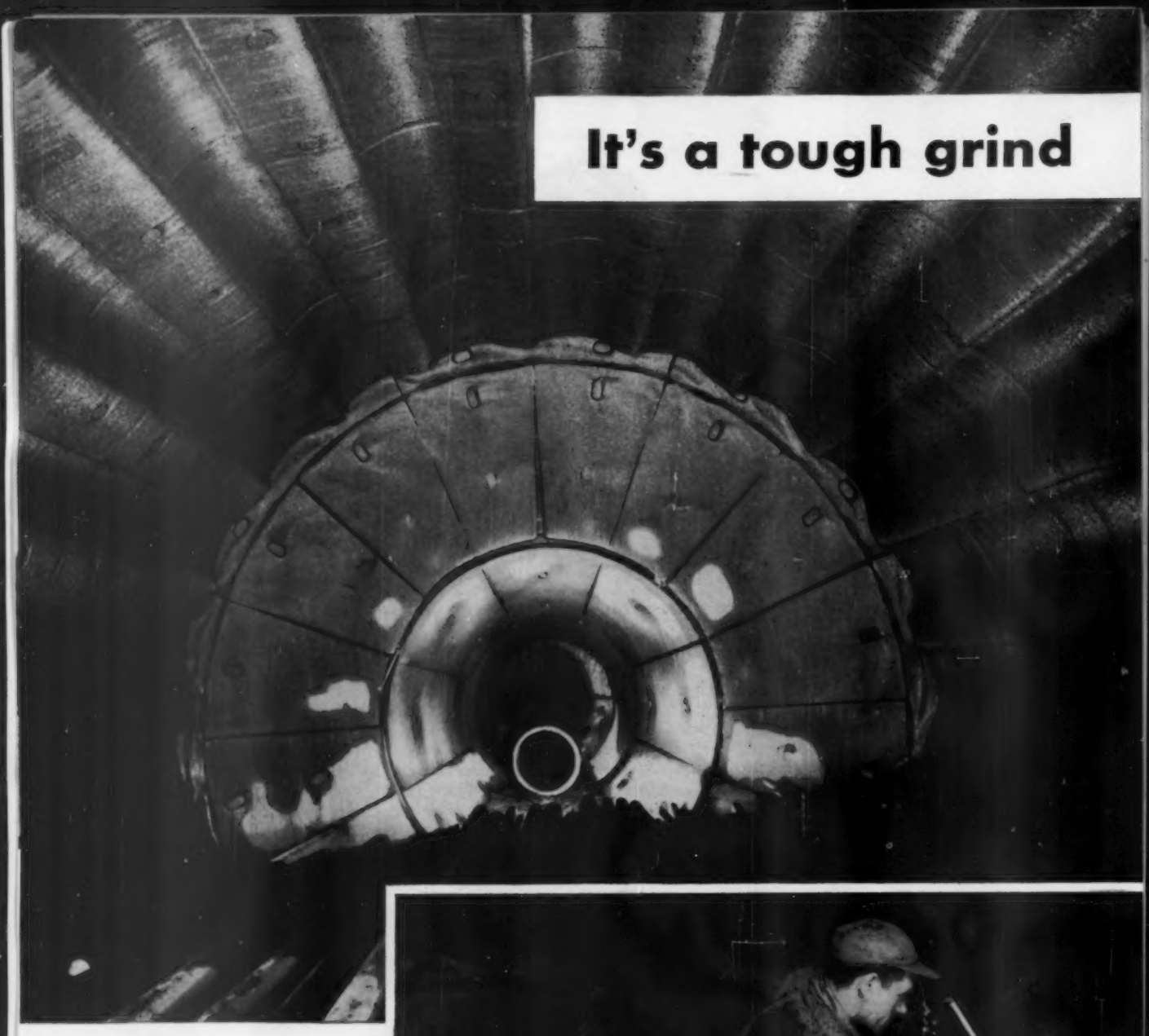
*World's Largest Manufacturers of Axles for Trucks, Buses and Trailers*

Plants at: Detroit, Michigan • Oshkosh, Wisconsin • Utica, New York • Ashtabula, Kenton and Newark, Ohio New Castle, Pennsylvania

**ONLY TDA BRAKES give all these tested advantages!**

- Brake shoes made of steel save up to 40 pounds per axle . . . give strong braking action with no distortion.
- Patented liner shape—thickest where wear is greatest.
- Liners riveted on—no chance of movement on shoe.
- Liners circle-ground to cover all efficient braking area of shoe.
- Rustproofed anchor pins locked in. Ends of pin sealed against foreign matter.
- First with self-aligning camshaft housings.
- Cam rollers heat-treated to roll smoother, wear longer.
- First with all-Nylon camshaft bushings.
- Compare similar products part for part and prove to yourself that TDA brakes incorporate the finest quality materials, skilled workmanship and advanced design.

# It's a tough grind



**These photographs** made inside one of Pilotac's Rod Mills clearly show the condition of the lining at the 680,000 ton mark. Notice the remaining wave as contrasted against the feed end liners.

**SEE** The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

# when you're handling Taconite... so they use USS Lorain Rolled Plate Linings

GRINDING a material as hard as iron-bearing taconite is really a tough job. Many milling authorities agree that Minnesota's Taconite ranks among the hardest ores to grind. The linings in Grinding Mills are subjected to extremely severe abrasion and considerable impact. An extraordinary lining is required to pass such a test. Here is an actual case history of what USS Lorain Rolled Plate Linings can do.

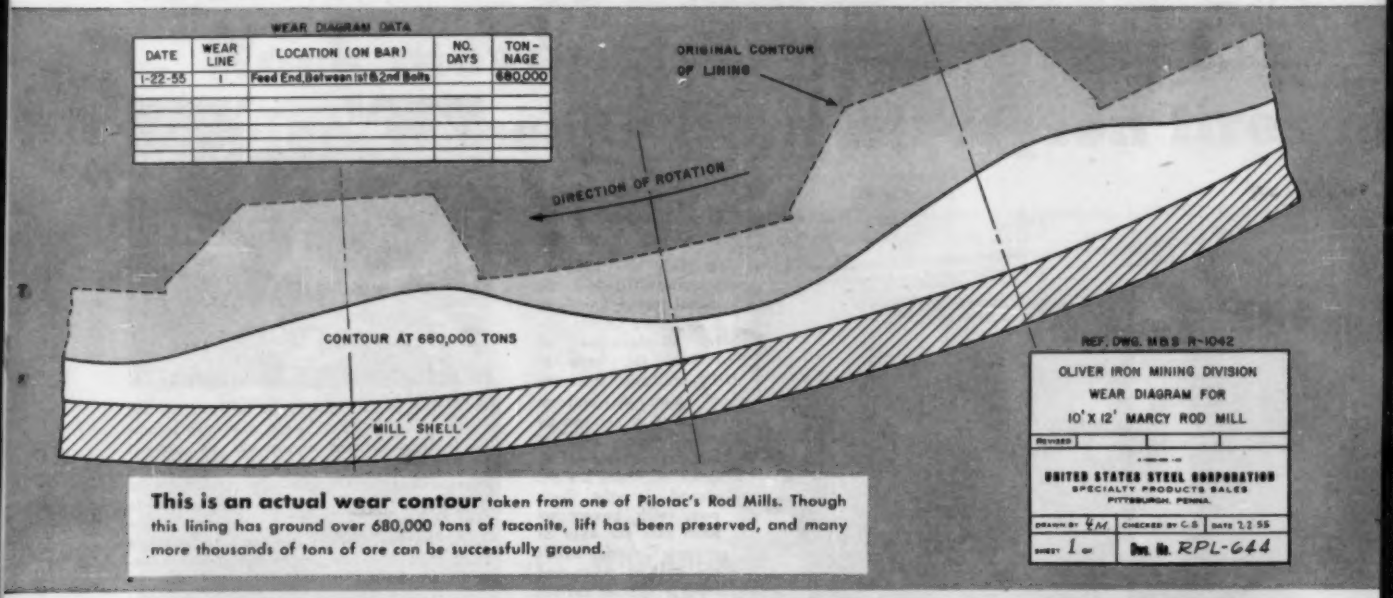
USS Lorain Rolled Plate Linings were specified for the 10′ 8″ Diameter Marcy Grinding Mills, built by the Mine and Smelter Supply Company of Denver, for "Pilotac"—Oliver Iron Mining's Pilot Taconite Plant at Mountain Iron, Minnesota.

Result: In one Rod Mill, over 680,000 tons of crude ore have been reduced by wet grinding from ¾″ feed to a 10 mesh ball mill feed—yet lift has been maintained. Consider the punishment the mill linings have taken. A combination of the hardest of ores with a constant load of 70 tons of steel rods up to 4″ in diameter have pounded away almost without stop. A study of the accompanying photographs and wear diagram indicates a considerable amount of lining remains—enough to grind many more thousands of tons of ore.

What makes this long life possible? USS Lorain Rolled Plate Linings are made of high carbon rolled steel liner plates and special heat treated alloy rolled steel lift bars. A marked differential in hardness favoring the lift bars is provided intentionally to maintain a constant lift height during the liner life and provide the rod or ball activity needed for efficient grinding. The wear on the harder lift bars, subject to both the abrasion of the ore and the impact of the rods or balls is thus correlated with the lesser wear on the liner plates caused primarily by the abrasion of the ore. Unlike castings, this "Dual-Hardness" feature insures lift until liner plates wear clear through to the shell. An additional feature of USS Lorain Rolled Plate Linings is the trouble-free special carbon manganese, heat treated, forged steel bolts used throughout. Operators readily appreciate the feature of "no bolt replacements." And closer tolerances between plates helps to eliminate shell wash and allied troubles that cause eventual wear to the mill shell.

Write to us now for the names of leading mill manufacturers who can supply you with USS Lorain Rolled Plate Linings.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK




**This is an actual wear contour** taken from one of Pilotac's Rod Mills. Though this lining has ground over 680,000 tons of taconite, lift has been preserved, and many more thousands of tons of ore can be successfully ground.

## USS LORAIN ROLLED PLATE LININGS *and* USS GRINDING BALLS

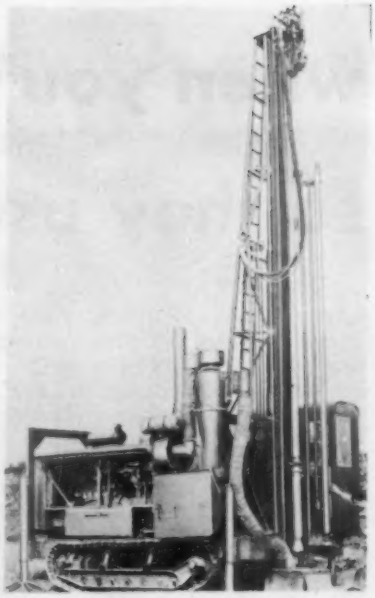
5-962

UNITED STATES STEEL

# New Machinery and Equipment

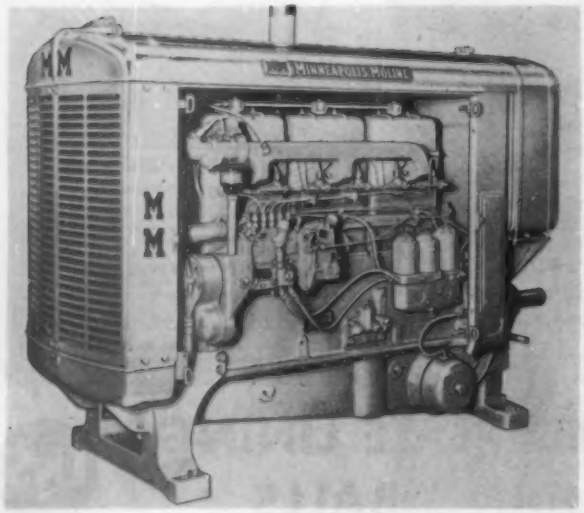
**(For more information, use card on p. 99)**

● Bulk transport bodies made by Baughman Mfg. Co., Inc., are ideally suited for fast, economical handling of cement, fly ash, etc. The firm says their bodies are made with an alloy steel which is 17% lighter, 30% stronger, and 5 times more rust resistant than ordinary steels. ← (51)

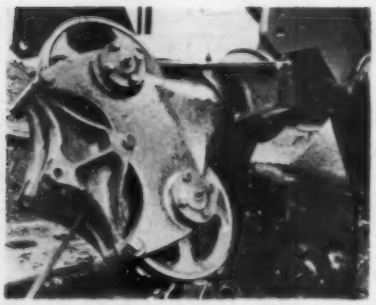


● Ingersoll-Rand announces their new triple duty Drillmaster, a self-contained drilling unit designed to speed up the drilling of rock and provide a range of hole sizes and drilling depths heretofore not available in a blast hole drill. The firm says it embodies three combinations or methods of drilling—Depth-Master, a down-the-hole drill for deep blast holes up to 6-in. in diameter; Power-Master, a new heavy-duty hammer drill for 4½-in. holes; and Roto-Master, a rotary drill ideal for holes up to 6¼-in. in diameter. Additional features include an easily-lowered tower providing long steel changes; positive chain feed; a dust collector, and I-R 600CFM rotary compressor; a motor driven crawler assembly; "out-in-front" full vision drilling; and many other features. The manufacturer is also making available the tower and drills for mounting by users on their own tractors or trucks. ↑ (52)

● A new Cedarapids portable crushing plant, the "Corporal," for producing crushed gravel or rock where the finished product does not have to be graded, has just been announced by Iowa Mfg. Co. Low 7-ft. 8-in. loading height, a 14- x 24-in. Cedarapids roller bearing jaw crusher, an 18-in. x 23-ft. 3-in. delivery conveyor, and choice of power units assure a rugged, dependable unit. → (53)

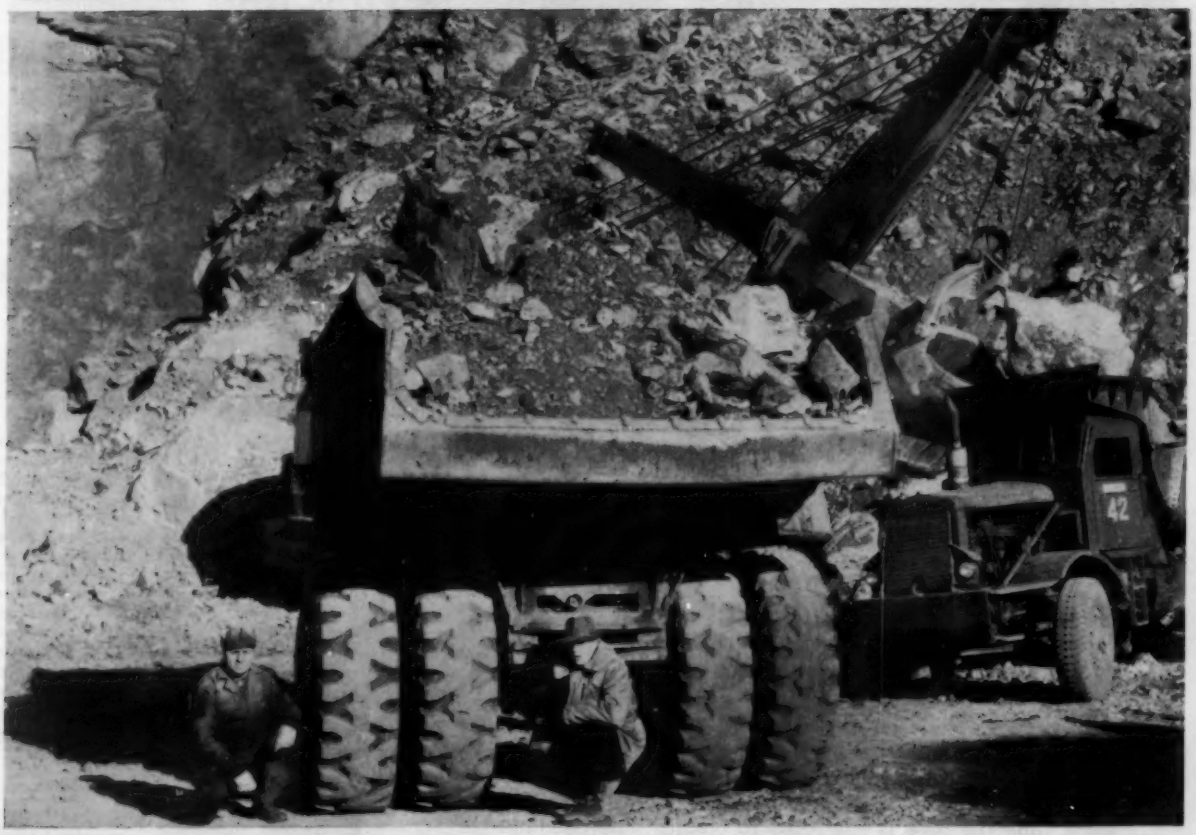



● This new 105 hp. Minneapolis-Moline diesel power unit with 6 cylinders boasts piston displacement of 605-cu. in., bore of 4⅝-in., and a stroke of 6-in. A uniform warm-up is assured by an especially efficient circulation system. Two large oil filters are enclosed in the base pan, with covers on each side for ease of access. Cylinder heads are cast in pairs and have a special system whereby coolant is directed to the hottest parts of the heads. ← (54)



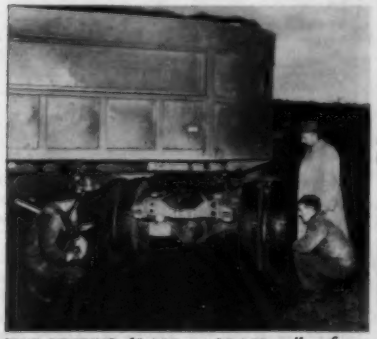
● A new, full-rotating type fairlead for use on Bucyrus-Erie 22-B ¾-yd. draglines is now available. Standard equipment on present 22-B models, this fairlead—with suitable bracket and anchor pin—can also be used to replace the old style swinging, or hinge type, fairlead on all 22-B draglines in the field. The new unit is designed to lengthen drag rope life and lessen maintenance expense for fairlead guide plates and sheaves. The rotating fairlead instantly assumes the plane in which the rope bends over the sheave. The fairlead frame is symmetrical and carries 2 identical sheaves either of which can rotate to an up or down position. The rope leads through the trunnion to the drum. ↑ (55)

# B.F.Goodrich



## Rock mover gets 6,000 hours of service, 2 recaps from All-Nylon tires

J. Robert Bazley, Inc., operates 260 units throughout central and eastern Pennsylvania. This Pottsville company moves rock, gravel and earth, constructs highways, does contracting and mechanical engineering, in addition to coal hauling. Trucks work as many as 21 hours a day carrying loads averaging 20 tons over rock and coal-strewn roads.



**"WE RECEIVE** 65,000 to 85,000 miles from *all-nylon* B. F. Goodrich Traction Express tires on the same jobs where 40,000 miles was considered excellent from other tires," says Mark Yoder, whose company hauls coal over Pennsylvania and New Jersey highways.

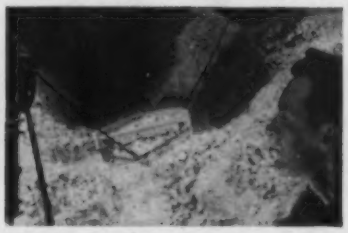
B. F. Goodrich *all-nylon* tires have worked 3,000 hours on the original tread, then put in an additional 3,000 hours on 2 recaps! Says Vice President James Bazley: "B. F. Goodrich *all-nylon* tires give us more recaps per tire and keep down-time and costs appreciably lower."

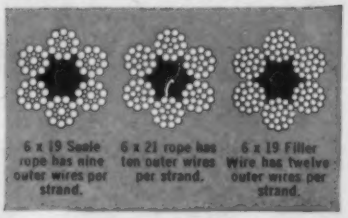
### Why All-Nylon tires cut costs

Nylon is stronger than ordinary cord materials, withstands double the impact and resists heat blowouts and flex breaks. *All-nylon* Universal (above) or Traction Express (left) tire bodies outwear their extra-thick treads, can still be recapped over and over! No wonder B. F. Goodrich *all-nylon* tires will give you longer service at lower cost.

Your B. F. Goodrich retailer has a complete line of *all-nylon* or rayon (smaller sizes and lower prices) tires for your mining work. Look for his address under Tires in the Yellow Pages of your phone book. See him today, or write *The B. F. Goodrich Co., Tire & Equipment Division, Akron 18, Ohio.*

**Specify B. F. Goodrich tires when ordering new equipment**




6 x 19 Seale rope has nine outer wires per strand.
6 x 21 rope has ten outer wires per strand.
6 x 19 Filler Wire has twelve outer wires per strand.

# What can you do better with 6x21 *Red-Strand* wire rope?

*What is 6 x 21 wire rope?* It is sometimes called 6 x 16 Filler Wire. It is a construction of intermediate flexibility—between coarse 6 x 19 Seale and flexible 6 x 19 Filler Wire. 6 x 21 is a good choice where the operation includes abrasion and at the same time the rope is subjected to considerable bending. On certain types of duty the choice is vital to save time, effort and money.

*When to use it?* If, for example, your 6 x 19 Filler Wire rope is wearing out too soon because of abrasion, 6 x 21 with larger outer wires may provide much longer life. If severe bending is damaging your 6 x 19 Seale, a change to more flexible 6 x 21 may be profitable.

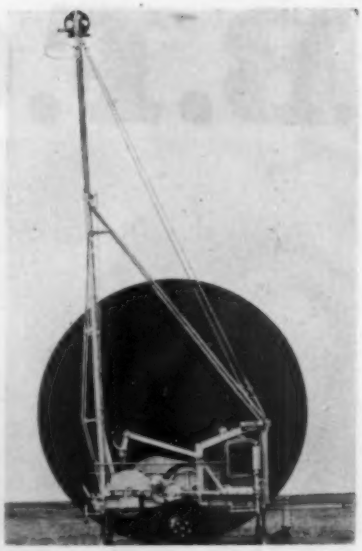
It is used on certain dragline jobs, vertical shaft hoists, drag and slackline scrapers, inclines, rotary and cable tool drilling rigs, and other equipment.

*Can you use it to advantage?* The best answer to that question comes from your Leschen technical man. Leschen representatives will help you get the most out of your wire rope. And with Hercules Red-Strand—as with all other Leschen wire rope, you are assured of *higher-than-rated quality* for *longer-than-expected service*.

See your Leschen man soon. He can easily be reached through your nearby Leschen distributor.

*Depend on Leschen's higher-than-rated quality for longer-than-expected service.*

LESCHEN
HERCULES *Red-Strand*® WIRE ROPE
LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.
St. Louis 12, Missouri
HKP

● Low cost and yet rugged is the way The Sanderson Cyclone Drill Co. describes its new rugged drilling rig. The Bantam 35 is designed to drill 2-, 2½-, 3-, and 4-in. diameter holes using the hollow rod or jetting method. It can also be used for drilling with cable tools, equipped with a 28-ft. one-piece derrick. A telescoping derrick is optional. The lightweight unit mounts on a 2-wheel trailer or 1-ton truck for easy maneuverability. It's powered by an efficient 4-cylinder, 11 hp. gasoline engine. One man can set it up and operate it quickly and easily. The unit is built ruggedly to stand rough usage and still deliver more holes faster at lower cost according to the manufacturer. (56)

● General Scientific Equipment Co. offers a feather-light protective mask workers enjoy wearing because it weighs less than ½ oz. It is made of soft rolled aluminum which is so pliable that it fits any shape face. For protection against ordinary non-toxic dusts and spray hazards, it may be worn with goggles and no metal touches the skin. The effectiveness of the device is readily seen by the discoloration of the filter caused by dust as indicated in the photograph. Combat silicosis and cut down on sick time by employing these feather-light protective masks. (57)

# How Link-Belt Speeder engineering helps both the shovel-crane and the operator

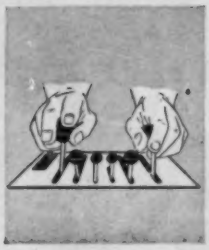
# increase earning capacity!

LS-98 with 60′ boom and 1¼ yard bucket works in sand and gravel pit.

***You're ahead on every job*** —Link-Belt Speeders—whether crawler or rubber-tired—are years ahead of the shovel-crane industry. Only Link-Belt Speeder offers you Speed-o-Matic—the true power hydraulic fingertip control system. Only Link-Belt Speeder offers you so many outstanding design, construction and operator advantages. For facts on every machine in the ½ to 3-yd, 10 to 60-ton work range—contact your Link-Belt Speeder distributor or write Link-Belt Speeder Corporation, Cedar Rapids, Iowa.

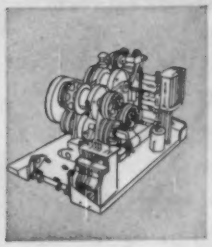
13.56

## *Two-way speed increase*



● Speed-o-Matic, the true power hydraulic control, provides fast, easy, smooth response . . . ideal control *for speed with accuracy*. It's also engineered to *reduce operator fatigue* — enables him to maintain greater output with less effort.

## *Extra power, stamina*



● Anti-friction bearings, splined shafts and precision-machined surfaces at every important point convert more *rated* hp into actual line pull. All-welded, stress-relieved construction permits use of extra power.

## *More work-time*

● Speed-o-Matic reduces operator fatigue, losses due to end-of-the-shift letdown. Further, it minimizes downtime. For example, Speed-o-Matic clutch is hydraulic actuated, self-compensating. Eliminates frequent stops for adjustment.

A demonstration can be arranged to suit your convenience. See one of these great machines in action and judge for yourself why they are today's most advanced shovel-cranes.

**LINK-BELT SPEEDER**

*Builders of a complete line of crawler and rubber-tired shovel-cranes*

# DIESEL AND GASOLINE ENGINE OPERATORS

# A NEW PM TOOL

# ADC* Oilprint Analysis

## CHECKS CRANKCASE OIL IN MINUTES

## Shell Research gives you new oil-change yardstick—

Now—operators can test crankcase oil in the short time allotted for refueling and crankcase oil checks. The Shell ADC Oilprint Analysis gives a practical and accurate oil evaluation in minutes.

ADC Oilprint Analysis means big savings when used in your preventive maintenance program . . . gives valuable information on engine and oil conditions. It answers the question "When do I change my oil?" thus eliminating the draining of usable oil and the risk of using oils loaded with contaminants.

See for yourself how the new Shell ADC Oilprint Analysis can save you money in preventive maintenance. Let us show how you can use this new service for your equipment.

**SAVES... Time, Money, Engines, Oil**

*Trademark

**SHELL OIL COMPANY,**

50 WEST 50TH STREET, NEW YORK 20, NEW YORK
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

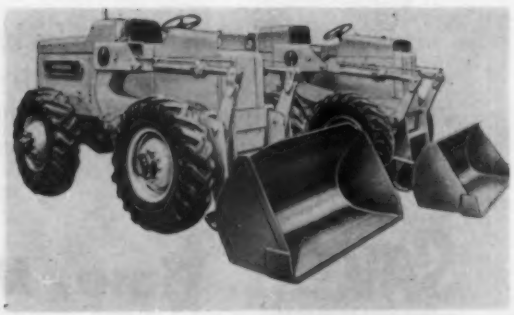
SHELL

● A new unit combining scalping and feeding in one operation made by the Simplicity Engineering Co. is called the Grizzly-Feeder. This oscillating feeder with a grizzly deck can cut operation and maintenance costs 50%, according to the manufacturer. In addition, it takes only half the space previously required. It is available in sizes from 2- x 8-ft. to 6- x 12-ft., and in capacities up to 1000 tons per hour. Its unique double shaft assembly allows the unit to feed on the horizontal when headroom is at a minimum. These twin shafts may be easily timed to vary the angle of the throw. By doing so, it can be determined at what particular angle of throw the grizzly deck will scalp material most efficiently. Construction of the grizzly deck permits the use of new abrasion-resisting alloys. Wearing surfaces can be equipped with replaceable liners. ▲ (58)

● Allis-Chalmers Mfg. Co. has announced the first all-silicone-rubber insulating system for large motors and generators. Known as the Silco-Flex system, it is immediately available for all Class H insulated form wound coils and for Class A and B windings operating under certain service conditions. In the above photograph conventional insulations are compared with Silco-Flex after sandblasting with 90 grit aluminum oxide and 100 psi. air for one minute. (Nozzle to sample distance was 6 in.) On the left, Silco-Flex is still holding up well; in the center, polyester mica tape has worn right through; and on the right sample, asphaltum mica tape has deteriorated even more. In making Silco-Flex coils, silicone rubber is applied to conductors and vulcanized by heat and pressure into a homogeneous mass. ▲ (59)

● A new loading attachment, the Excaloder, design for the Link-Belt Speeder heavy-duty one-yard LS-98 shovel-crane for horizontal, straight-line loading operations is now available. The Excaloder is interchangeable with the other attachments for the LS-98, and features exceptionally low overhead clearance—standard mast requires only 15-ft. 10-in. clearance height. An optional low mast has minimum clearance height of only 11-ft. 3-in. Maximum dumping height, with stick extended at 45 degrees, is 16-ft. 11-in. and with stick retracted at 45 degrees, it is 11-ft. 4-in. The Excaloder is operated by convenient Speed-O-Matic controls. A time saving feature is that the bucket will close automatically when the dumping lever is released, or can be retained open by toggling the control lever in the fully open position. ◀ (60)

● This general purpose dump body of 2 cu. yd. capacity and designed for mounting on one ton pick-up trucks, has been announced by The Galion Allsteel Body Co. Known as the Handi-man, the new body is available in both fixed and removable side types. The fixed side model is constructed of 10 gauge high-resistance steel throughout, and the understructure consists of 3-in. channel crossmembers and 3-in. channel longitudinals. The removable side model features similar construction plus the added advantage of fully removable sides and rear corner posts. Both models, offered in lengths of 7½- and 8-ft., are 78-in. wide inside. The sturdy double-acting tailgate, fitted with fabricated hardware and up-hook type lower latches, is controlled by a lever at the corner of the body. ▲ (61)



● The Frank Hough Co. has just announced the addition of two new four-wheel-drive models to their line of "Payloader" tractor-shovels. These new machines are the model HU, with a one cu. yd. heaped-capacity and the HH, with a 1½-cu. yd. heaped capacity. Outstanding among the features of these new models is the design which permits 40 degrees of bucket "breakout" at ground level rather than at a 3- or 4-ft. carry position, according to the maker. Furthermore, to obtain maximum loads with a minimum of effort, a powerful pry-out action is accomplished by using breakout pads on the ground as a fulcrum for leverage. They both incorporate 12-volt battery systems. Features common to both units include sealed, pressurized hydraulic systems, and a hydraulic oil reservoir mounted behind the driver's seat for easy accessibility. ▲ (62)

# Cost Per Ton Broken Cut 58%

| Drill | Bit Size | Rock | Feet per Shift | Cost per Ft. Drilled | Cost per Ton Broken |
|---|---|---|---|---|---|
| Rotary Drill "X" | 6-⅝ & 7-⅜ | Average & Hard | 110 | 0.95 | .053 |
| Bucyrus-Erie 50-R | 9-⅞ | Average & Hard | 145 | 0.76 | .022 |

# with 50-R Rotary Drill

Records of drilling performance and costs for two rotary drills, working in a quarry operated by a large cement company in the Far West, revealed this remarkable performance record for a 50-R drill — a reduction of 19 cents per foot drilled; a 58% reduction in the cost per ton broken!

This is just one of many case histories which are proving the drilling superiority of the 50-R daily. Behind performance like this are these outstanding features:

★ Ward Leonard electric control on rotation of drill pipe permits drilling at most efficient speed for a given formation.

★ Pulldown force is hydraulically powered for maximum controlled penetration.

★ Machine drills continuously for 32-⅔ feet before an additional drill pipe section must be added.

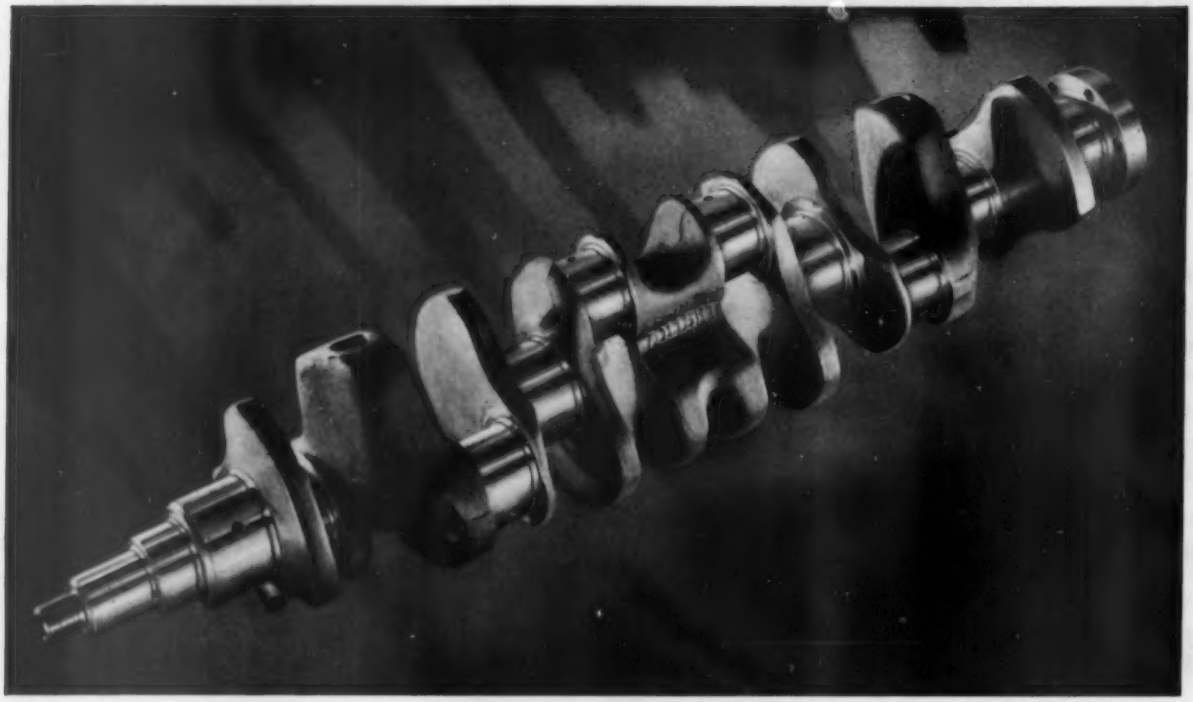
★ Remote-controlled power-driven tool handling unit permits drill pipe sections to be added or removed in a few minutes and without heavy manual effort.

For a complete rundown of all important 50-R features, write today. 17B55C

BUCYRUS ERIE

South Milwaukee, Wisconsin

# *A truck engine needs a "backbone" like this—*



**From fiery forges and precision machines** come extra-strong INTERNATIONAL crankshafts. Those used in light-duty models are 17% heavier than the average of comparable forged or cast alloy 6-cylinder designs—for maximum strength and rigidity, long life.

## *to save you the BIG money*

**Crankshafts** are just one example of INTERNATIONAL all-truck engineering that saves you the *big money*.

Of the five leading makes, only INTERNATIONAL builds a complete line of models that are *all-truck* . . . with no automobile engines or components asked to do a truck job.

You save the most with an INTERNATIONAL that's *all-truck built* to last longer. It earns its keep in lower over-the-years operating and maintenance cost. It pays for itself in use. It saves you—earns you—the *big money*.

Keeping costs down has made INTERNATIONAL the heavy-duty leader for 23 straight years. Let your INTERNATIONAL Dealer or Branch show you the right INTERNATIONAL for your job—built to save you the BIG money.

**There's an INTERNATIONAL** *exactly right* **for every quarry hauling job—** *all-truck built to save you the BIG money*. 200 basic models—4,200 to 90,000 lbs. GVW, conventional and COE, 4-wheel, 6-wheel, four-wheel-drive. World's widest choice of power and power transmission options.

**INTERNATIONAL HARVESTER COMPANY • CHICAGO**

**INTERNATIONAL® TRUCKS**

***All-Truck Built to save you the BIG money!***

Top TV Comedy! Ronald Colman and Benita Hume in "The Halls of Ivy," CBS-TV, Tuesdays, 8:30 p.m., EDT

International Harvester Builds **McCORMICK®** Farm Equipment and **FARMALL®** Tractors...Motor Trucks...Industrial Power...Refrigerators and Freezers

## YOU USE BRICK TO BUILD A BUS

Behind everything that's made or moved lies the refractory brick that contains the flames, the enormous heats, of industry.

Without refractory brick, you'd see no bus in this picture. Nor any picture, for that matter.

Making refractories for the infinite requirements demanded of them is a precise and exacting science, stemming from vast resources of mines, minerals and laboratory control.

And General Refractories provides them from multiple plants and warehouses strategically located to serve industry swiftly . . . dependably . . . economically.

**GENERAL REFRACTORIES CO.**
Philadelphia 2

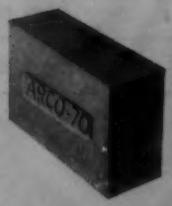
# GENERAL REFRACTORIES

A COMPLETE REFRACTORIES SERVICE

FOR THE ROCK PRODUCTS INDUSTRY . . .

**STEELKLAD** basic kiln liner permanently jacketed in a patented steel shell with special marking. See that notch? Assures correct installation.

**ARCO-70** is a high alumina fireclay brick of the 70% alumina classification. Ideally suited for use in cement kilns.



# FREE PUMP ANALYSIS

**Experienced hydraulic engineers will figure your exact pump needs without obligation...**

You'll learn what size your pump should be... its required capacity for your installation... minimum and maximum power requirements... its output on 10%, 15% and 25% solutions of sand, gravel and water... and other facts you need to know when you have to pump.

Whether you've just struck water or want an analysis of an old pumping operation makes no difference. Amsco® hydraulic engineers will give you all the information you need, so that you can select a proper pump... one which will fit your particular requirements. Mail the coupon today.

## AMSCO DIVISION

AMERICAN Brake Shoe COMPANY

Chicago Heights, Ill.

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Amsco Division (Pump Department)
Chicago Heights, Ill.

I want a *free* pump analysis without obligating myself in any way. Send information to:

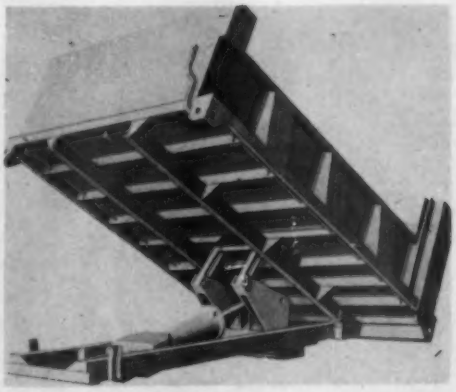
Name_____

Company_____

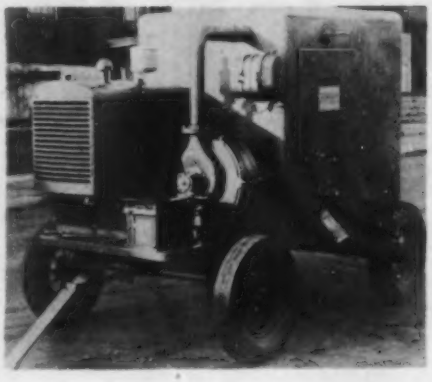
Address_____

City_____ State_____

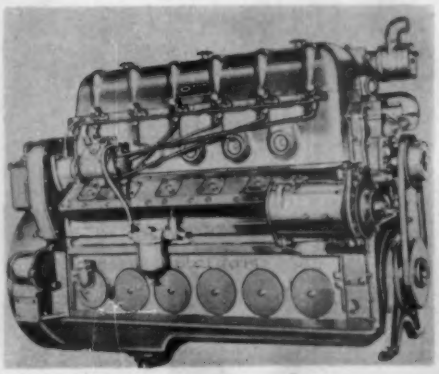
● Euclid Div. of General Motors Corp., is now in limited production on its TC-12 Twin-Power crawler tractor. Its outstanding feature is the use of two 194 hp. Series 6-71 G.M. diesels. These diesels give it 80% more hp. with only 40% more weight than tractors currently in use. Each of the engines drives one of the 39-shoe tracks. Three gears, forward and reverse, provide speeds to 1.5 mph. in low range, 3 mph. in intermediate, and 8.3 mph. in high. ← (63)



● The Hoist & Body Div. of the Flint Tool and Mfg. Co., announces the new "Dube' Dumper," an improved hoist and dump body. The 7 sizes of arm-type hoists have precision honed cylinders with a bolted head for easier servicing. The piston has 6 rings used in pairs for maximum lifting and holding efficiency. Bodies have 10-in. box-type side braces to provide great strength and rigidity. Including the box type corner posts, 40% of the body side is reinforced. Tapered body is standard, 2 in. wider at rear for faster dumping without sacrificing capacity. → (64)



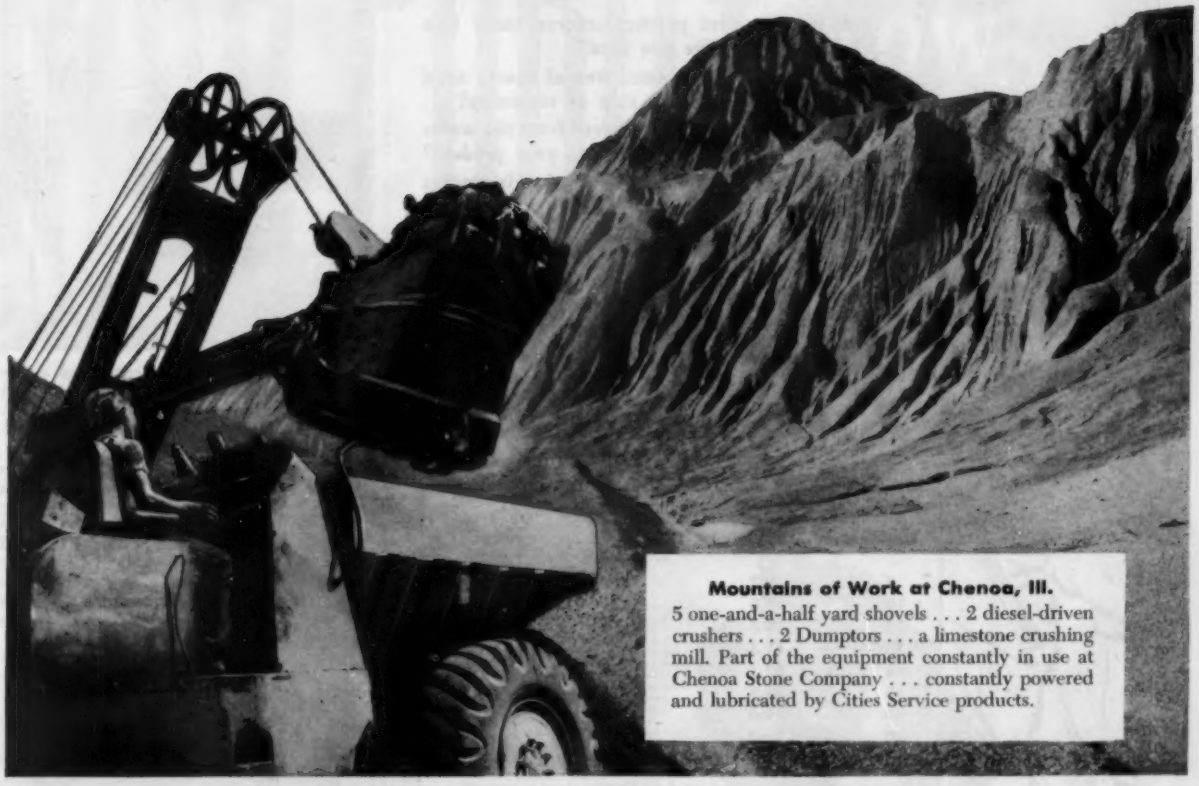
● Shown is the Kadco Corp. new 4-gun dust machine with Oliver diesel engine power. The new model is lower and wider and thus establishes a better center of gravity. When using this machine, there is less frequent need for bit sharpening and changes, and no blow-back is encountered. The unit is available with gas, diesel, or electric motor drive. The new, lower dimensions allow for better visibility on the work and for stability and weight distribution on the prime mover. An external shaker handle permits filter bag de-dusting without opening the machine. ← (65)



● An entirely new fuel system designed around the Roosa-Master pump is now standard equipment on all diesel engines being produced by Harnischfeger Corp. This new pump, engineered strictly for P&H diesel engines, is simple in design—it does away with a total of 131 parts and is 49.5 lbs. lighter. It makes engine starting easier because injection is automatically retarded until an engine speed of 500 rpm is reached. The new pump also improves engine torque which, in mobile sets, results in better performance and greater responsiveness to the operator's control. → (66)

# Cities Service C-300 cuts make-up oil 600%!

**Stone cold facts from the**
**Chenoa Stone Company, Chenoa, Illinois**



**Mountains of Work at Chenoa, Ill.**
5 one-and-a-half yard shovels . . . 2 diesel-driven crushers . . . 2 Dumptors . . . a limestone crushing mill. Part of the equipment constantly in use at Chenoa Stone Company . . . constantly powered and lubricated by Cities Service products.

Here's the story in the words of David D. Vickrey, Superintendent of Chenoa Stone Company:

"About two years ago, we switched from another nationally prominent brand oil to Cities Service C-300 Series Motor Oil. The results have been amazing.

"C-300's detergent action completely eliminated a bothersome sludge problem. On our first three oil changes with it, we removed 5 gallons of sludge from each of our 200 horsepower diesels. Since then, these diesels have remained clean, and today, when we open the crankcase, we can even see the paint.

"We also are using far less oil between changes. In fact Cities Service C-300 actually cut make-up oil from 5 to 6 gallons every 150 hours to less than one gallon every 150 hours!

"In addition to C-300 oil, we use Cities Service Lubricants for every requirement... Diesel Fuel, Gasolenes, Trojan M Grease and hydraulic fluid. We have been completely satisfied with every product.

"Cities Service has given us top-notch service, the best we've ever had. We are better supplied than ever and have learned to rely on Cities Service dependability."

There is nothing Cities Service could possibly add to Mr. Vickrey's statement, except a reminder to contact your local Cities Service representative in order that you may enjoy similar results in *your* operation. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

**CITIES SERVICE**

**QUALITY PETROLEUM PRODUCTS**

# Does your "CLASSIFIER" CLASSIFY?

★ Is your first product (coarse sand) free from excessive fine sand?

★ Is your medium sand free of coarse sand without the extra step of screening?

★ Is your fine sand recovered from the water and delivered directly into your product?

★ Are you free therefore of the costly process of reclaiming your fines from a sludge pond?

Before answering the questions, compare your "Classifier" records with the following authenticated record of a 72" Auto-Vortex Cone Classifier handling 140 t.p.h. of crushed stone.

| Mesh | FEED | OVERSIZE PRODUCT % passing | OVERFLOW PRODUCT |
|---|---|---|---|
| 8 | 79.7 | 73.2 | 100.0 |
| 10 | 67.0 | 54.8 | 100.0 |
| 20 | 49.8 | 31.9 | 100.0 |
| 30 | 41.6 | 22.5 | 99.8 |
| 40 | 37.1 | 15.7 | 97.0 |
| 48 | 33.8 | 12.1 | 93.8 |
| 60 | 29.0 | 9.5 | 90.8 |
| 80 | 26.0 | 6.9 | 85.1 |
| 100 | 22.1 | 5.2 | 78.0 |

*These are actual records of an Auto-Vortex plant in operation. Names of this and other plants with equally impressive records will be furnished on request.*

Now, if your equipment does **not** deliver a like capacity to similar exacting gradation, and if your answer to any or all of the above questions is "NO," then your answer to the big question, "DOES YOUR 'CLASSIFIER' CLASSIFY?" must also be "NO."

If sand "classification" is your business, Auto-Vortex Classifiers truly live up to the name. They automatically "classify," and can change all your "NO" answers to "YES"!

This month 9 new Auto-Vortex Plants of various capacities will be in operation in the United States . . . either as original equipment, as replacement for existing equipment, or as auxiliary equipment to catch the fines lost by existing equipment. Operators of these new plants have selected Auto-Vortex Classifiers only after checking performance records and low operational costs of Auto-Vortex installations from coast to coast . . . plants which for over 25 years have been producing profitable gradations to the most exacting specifications.

AUTO VORTEX Trade Mark Reg.

**CLASSIFIERS**

**are fully described in a Wood Company bulletin . . . yours for the asking. Also available are authentic records of plants with problems like yours, showing how A-V Classifiers can really "classify" . . . whatever the capacity or required specifications. Call or write us today!**

**CHARLES E. WOOD COMPANY**

906 NORTH WATER ST. • MILWAUKEE 2, WISCONSIN

● Reich Bros. Mfg. Co. announces a new multi-purpose rotary drilling unit in truck and crawler models. Shown on a D-8 Caterpillar tractor, the drill mast can plumb independently 20 degrees in all directions, which is assurance of fine work in all types of rough terrain. Standard equipment includes a hydraulic power wrench which provides 8000 lb. pull to break tight stems; an exhauster type dust collector to remove dust from the hole and pipe it away from the operator and drill; and a jib crane on the lever type drill and internal racking device on the upright mast type drill which aids in making drilling a one-man operation. (67)

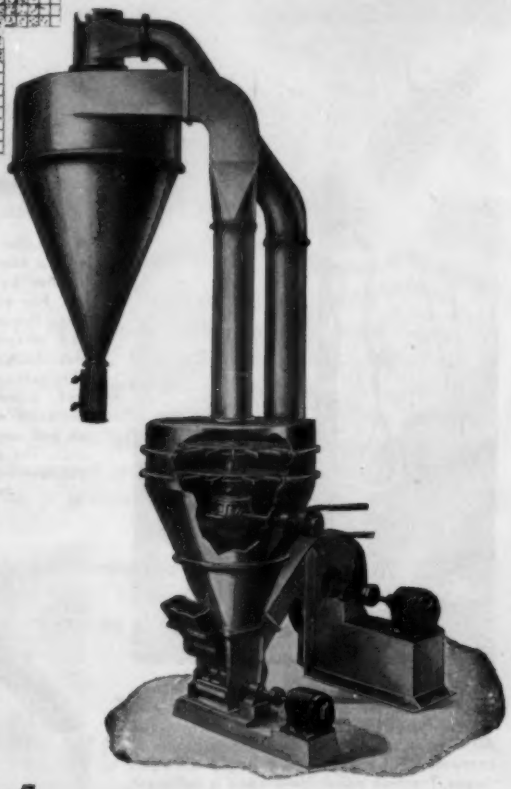
● Operating convenience has been stressed in designing a new line of AC transformer type arc welders announced by Hobart Bros. Co. Available with or without capacitors, the welders are dual rated at 250-amp. on 30% duty cycle, or 200-amp. on 50% duty cycle for operation on single phase, 60-cycle, 230-volts supply line. Welding current selection is made through a simple twist of the rubber wheel and rheostat knob. The transformer is the "Saturable Leakage Path" type for maximum efficiency, ease of arc striking, and smooth welding. There are no moving parts, eliminating parts maintenance. (68)

# HIGH PURITY LOW COST

## HYDRATED LIME PRODUCTS

UP TO **99.5%** PASSING **400-MESH**

*Write for Raymond CATALOG No. 60*



**THE RAYMOND AUTOMATIC PULVERIZER** is the standard "Lime Mill" of industry for producing all grades of hydrated lime, ranging from superfine chemical hydrate and spray lime to mason's and agricultural hydrate.

This one machine handles the complete operation: disintegrating, classifying and conveying the finished lime, as well as automatically rejecting impurities.

Whizzer air separation provides easy and close control of the product. Changing from one grade to another is made by one simple adjustment. You are assured of a consistently uniform hydrate and greatly increased capacity—plus the advantage of unusually low cost operation and maintenance.

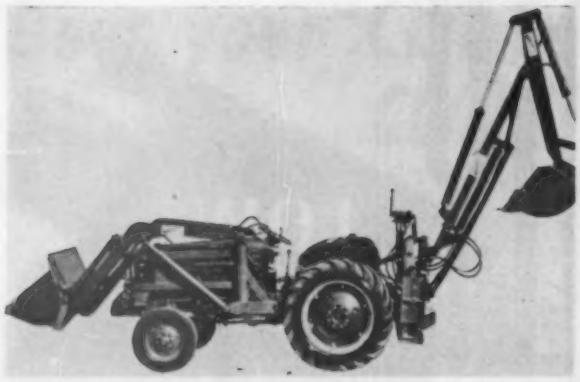
***Write for further details and applications of the Raymond Automatic Pulverizer.***

**COMBUSTION ENGINEERING, INC.**

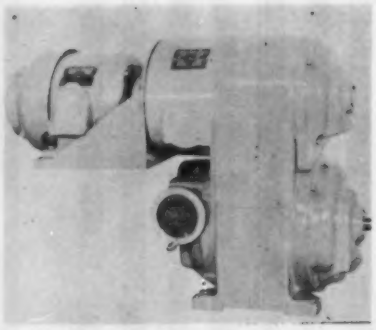
*Raymond Division*

1321 NORTH BRANCH ST.
CHICAGO 22, ILLINOIS

SALES OFFICES IN PRINCIPAL CITIES



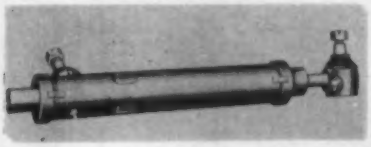
● Henry Mfg. Co., Inc., announces the new Henry hydraulic backhoe, and the new Henry hydraulic tractor shovel, both of which have been approved for use together on International Harvester's model 300 tractor. The backhoe is standard with a boom digging 8 ft. A utility bucket is provided on the tractor. ← (69)



● The Speed-Trol variable speed transmission has been made available by Sterling Electric Motors, Inc. Through means of a flexible coupling and mounting shelf, any foot mounted motor can be coupled with the unit. It is available in explosion- and drip-proof and totally enclosed housings. The Speed-Trol embodies such features as finger-tip control of speed change and positively-displaced variable pitch pulleys. Mounting dimensions for Speed-Trol motors with integral gear reducers are interchangeable with those of the Slo-Speed gear motor itself. ↑ (70)

● A new line of tubular fabricated alloy wires designed for open arc application through standard semi-automatic welders has just been announced by Stoody Co. Essentially, this is a new process that requires no flux and offers the versatility of manual welding with great control. Depositing 7 to 15 lb. of hard metal an hour, the firm says this outstanding "material-and-method" combination makes possible a welding speed much greater than that of the manual process. In operation, semi-automatic welding using the Stoody tubular wires is much like manual welding but wire feed is continuous and both feed and arc control are automatic. ← (71)

● Skullgard plastic safety helmets introduced by Mine Safety Appliances Co., offer extra protection in the "danger zone"—the front, top, and back areas of a hat that working positions expose most often to impact. The Skullgard is high-pressure molded in one piece from hard, smooth, laminated plastic. The rounded contours and strength provide effective deflection of falling or flying objects. The hat stays on despite violent head motions and yet is comfortable to wear. ↑ (73)



● Smaller vehicles can now be equipped with a low-cost oil-hydraulic power steering booster by using the one made by Vickers Inc. For vehicles in the 4000- to 10,000-lb. class, the unit achieves low-cost with a simplified streamlined double-tube construction. This design provides internal oil flow and eliminates external piping. With the new design, assembly tie rods are eliminated and replaced with end caps which are screwed on and secured with removable tack-welded clips. The annular space between the double cylinder walls is utilized for booster oil flow. ↑ (72)

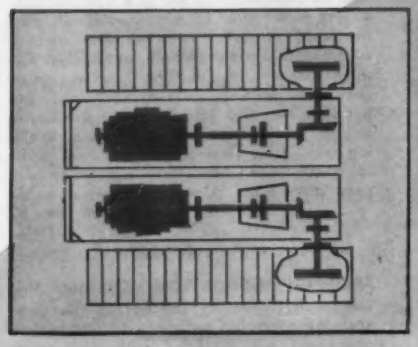
● Gardner-Denver Co. announces the new Air Trac(R), self-propelled drill carrier with crawler-type tracks. On rough terrain the Air Trac is said to have proved superior to conventional wheel-mounted wagon drill carriages. Traction power developed is sufficient to haul an 11,720-lb. compressor up a 10% grade. The T-bar supports a G-D chain feed and rock drill. The T-bar swings through a vertical arc of 86½ degrees, providing accurate line-up for vertical, angle, or toe holes. The T-bar controlling height of the chain feed is positioned by a hydraulic hand pump that actuates two lift cylinders. ↑ (74)

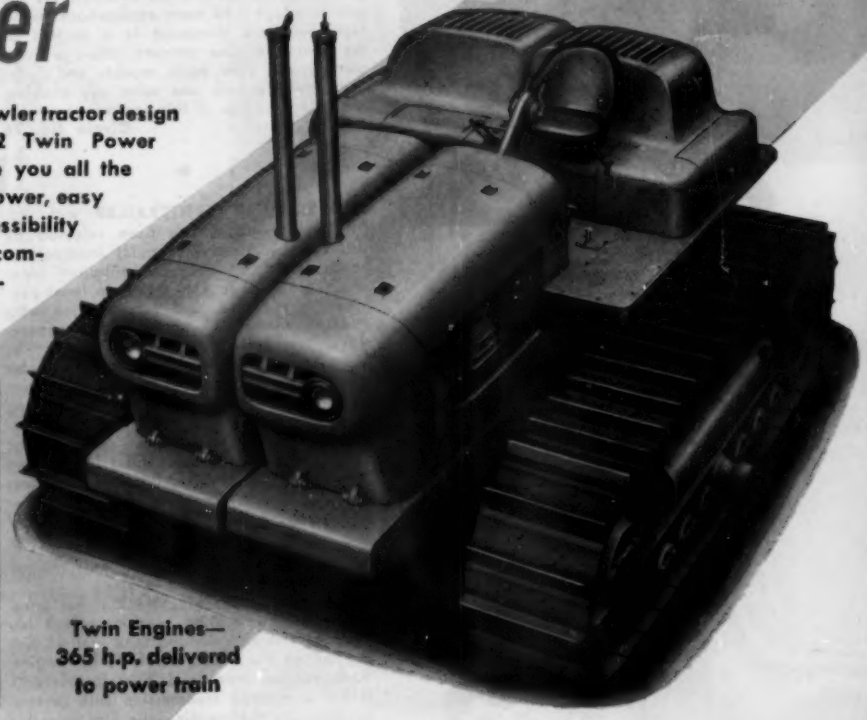
● The new, straight-line bucket loader just announced by the N. P. Nelson Iron Works, Inc., has a capacity of over 3,000 tons per day. This B-68 features hydraulic crowd, power steering, hydraulic controls, 20 mph road speed, an engine of 115 hp., 4-wheel drive with 4-wheel booster brakes, Timken-Detroit axles front and rear, and complete accessibility for maintenance. The chute of this 38,000-lb. machine will discharge at a maximum height of 14 ft. 11 in. ← (75)

# Biggest Tractor News in Years...

# the "Euc" TC-12 Twin Crawler

**Here's a completely new concept of crawler tractor design and performance . . . the new TC-12 Twin Power Euclid. It's designed and built to give you all the features you want in a tractor—more power, easy operation, greater workability and accessibility for servicing . . . and all power train components are matched, with years of application in earth moving equipment,**





**Twin Engines—365 h.p. delivered to power train**

## SPECIFICATIONS

| | |
|---|---|
| total h.p.—388 h.p. at rated speed | |
| available for tractive effort—365 h.p. | |
| speeds—3 speed ranges forward and reverse to 8.3 mph | |
| drawbar pull (bare tractor)—forward and reverse | 54,000 lbs. low range<br>53,500 lbs. intermediate<br>53,000 lbs. high range |
| track width (standard shoe) | 26" |
| track gauge | 110" |
| overall width | 11' 4" |
| overall length | 16' 2" |
| height (excluding stacks) | 7' 11" |
| drawbar height | 23" |
| ground clearance | 20" |
| operating weight (bare) | approx. 58,000 lbs. |

Powered by two diesels with separate Torqmatic Drives for each track, the TC-12 has 365 h.p. available for tractive effort—a smooth steady flow of power to meet any job requirement. There's no master clutch and no manual gear shifting . . . the operator simply moves a lever to select one of three speed ranges—forward and reverse—for travel speeds up to 8.3 m.p.h. Maximum drawbar pull is equal to, or greater than, the weight of the tractor and any attachments.

Each half of the tractor is separate and free to oscillate on a single transverse shaft. This gives the TC-12 maximum stability and traction on rough ground. The tractor can be easily separated into two halves for shipment when necessary.

## Never before so much workability!

**EUCLID DIVISION** GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

# Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

GM GENERAL MOTORS

# BIN STUCK LATELY?

Here I am lying in bed wondering how to loosen up the material in those troublesome bins. What am I going to do?

Get yourself some sleep, brother . . . a CLEVELAND AIR OR ELECTRIC VIBRATOR will stop arching, bridging or sticking in your bins *quickly* and *quietly!*

*Literature on request.*

THE CLEVELAND VIBRATOR COMPANY

2710 Clinton Ave. • Cleveland 13, Ohio


## P & Q *product briefs*

(use reply card for more information)

**INDUSTRIAL GUN** made by Remington Arms Co., Inc., is for kilns, refractories, mines, quarries, and other industrial uses. This brochure describes the firm's gun which features heavier construction, firing pin presented transversely to primer, mortise breech block, and a loading platform—all of which assure faster firing and greater safety. Several mounts are available for the gun to adapt it to many applications. Firing techniques are discussed in a section of the literature. The concern offers a complete line of guns, parts, mounts, and shells; and offers to help you solve any problem regarding the use of this equipment **Circle No. 76**

•

**CENTER-DUMP SEMITRAILER** with 20- to 30-yd. capacity has been released by the Omaha Standard Co. It incorporates construction and weight distribution ideas which enable it to haul maximum legal payloads on the road, and yet have the extra strength needed for off-the-highway operations. Truss-type construction permits the use of lighter-weight members and provides a load area completely free of all obstructions, with all reinforcements and bracing outside the hopper. A simple hydraulic system, controlled from the cab, actuates the hopper doors in both opening and closing operations. A positive lock latch assures tight, leakproof closure of the doors under all conditions. **Circle No. 77**

•

**DRILL** The Loomis Machine Co. has introduced a new drilling machine which has such features as a divided sand reel, 22,000-lb. pull on the casing block, 49 hp. engine, 40-ft. rugged mast, and 2000 lb. of tools. It has a 4-speed transmission with reverse. In designing the machine, the firm consulted men in the field to find out which features were really desired, and then they proceeded to construct this drill which they believe incorporates all the practical ideas wanted. The frame is solidly built of 4- to 9-in. channels for compact yet very accessible mounting of the machine components. The mast will support 25,000 lb. on the hook with a 4-part line. Both the upper and lower sections are cross and diagonally braced at each step. **Circle No. 78**

•

**SCREENING COSTS** are cut when using the products of the Ludlow-Saylor Wire Cloth Co. Their stress-free assembly prevents distortion of screen openings, and continuous testing for conformance to specifications guarantees top resistance to abrasion, set, and fatigue. A data book offered by the company is chock-full of helpful information and tables on wire cloth and screens for all your needs. All weaving equipment and looms are designed, built, and maintained within the Ludlow-Saylor plants to insure uncommon accuracy. **Circle No. 79**

•

**SACK FILLING** is greatly facilitated by using the new open mouth filling machine made by the Kraft Bag Corporation. The machine is capable of 22 to 24 100-lb. charges a minute, with one man hanging bags, using standard size and standard type open mouth bags. Such increased production means important savings in packaging costs, and the economy factor is even greater when converting from valve bags. Its simplicity makes possible operation by an unskilled worker, and because it is pace-setting, the machine require no head of material to maintain accuracy. **Circle No. 80**

•

**ELECTRIC VIBRATOR** The Cleveland Vibrator Co. has developed the RC-30-LSRR, a quiet, portable, powerful addition to its line of electric vibrators. It employs the rotary weight shaft principle of developing vibration but is self-contained with no pulleys or belting. A totally enclosed housing seals the unit from moisture and dust, and it is available in a choice of voltages from 110 to 550. The working frequency is 3600 powerful impulses per minute, corresponding to 60 cycles per second. **Circle No. 81**

•

**AN ELECTRODE** of 11%-13½% manganese-nickel composition made by the Stulz-Sickles Co., for steel welding has great ease of handling, and yet is a genuine manganese-nickel alloy. It produces tough, ductile weld deposits with full and uniform work-hardening and tensile properties. The secret is in the Flo-Kote coating, which eliminates peening, weaving and bead, and puddling the arc. Sound stringer beads can be run without porosity or cracking. Welding with these electrodes is claimed to be so simple that a beginner can learn in a very short time to make successful welds. **Circle No. 82**

•

**FEEDING, PROPORTIONING,** or blending using units made by The Bonnot Co. gives accurate control. Continuous or intermittent operations are provided with their products which include rotary kilns, rotary dryers, pulverizers, ball mills, and other specialized equipment. Feeders can be supplied to deliver materials in quantities as high as 375 tons per hour, Horsepower requirements vary from ¼ to 7½ hp. Hopper connection diameters vary from 6- to 42-in. **Circle No. 83**

•

**"THE HUMAN VALVE"** is the way Red Jacket Co., Inc., describes its new type of control valve for handling solids in suspension. It is springless, packless, provides unobstructed flow, has no moving parts, large seating surface, blow out protection, and uses only one wearing part. The valve operates by air or hydraulic pressure compressing the rubber sleeve. Pressure in the annular space between the valve body and sleeve does the work—as the pressure varies, the opening of the valve varies. **Circle No. 84**

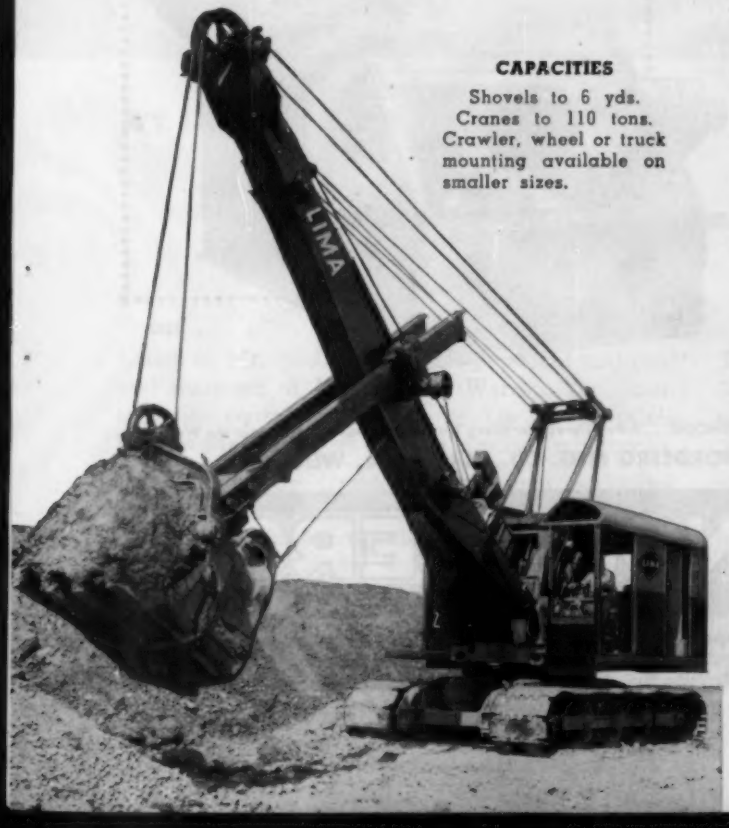
•

**DUST COLLECTORS** made by Van-Truer Co., Inc., are custom-built to meet your specifications. Their wet-type collectors range in size from 500- to 40,000-cfm. A simple design with no moving parts assures you that nothing will get out of balance. Fans for all units are mounted vertically above the collector or standard arrangement fans can be used. **Circle No. 85**

# LIMA'S new Electric Power Unit eliminates stalls, won't burn out

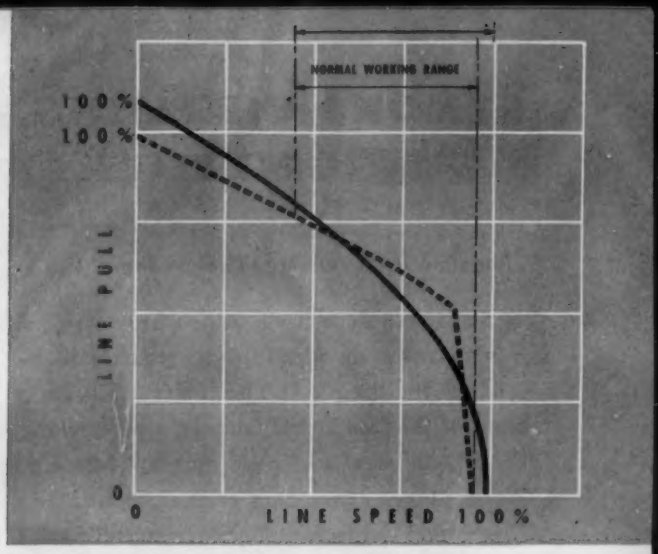
LIMA's new optional power unit matches, *electrically*, diesel-torque converter performance. It combines an AC motor with a single stage torque converter to adapt actual power output to work load demand—at constant motor speed. Thus, you get power on demand through a wide operating range . . . and the motor will not stall or burn out in heavy load operation.

Just check the performance curves —— They make it clear that LIMA's new electric power unit is the perfect answer when your job calls for electrically powered machines. The new unit is available on every LIMA machine. It will pay you to get the full story today from your nearby LIMA distributor . . . or write: Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.




**CAPACITIES**

Shovels to 6 yds.
Cranes to 110 tons.
Crawler, wheel or truck mounting available on smaller sizes.

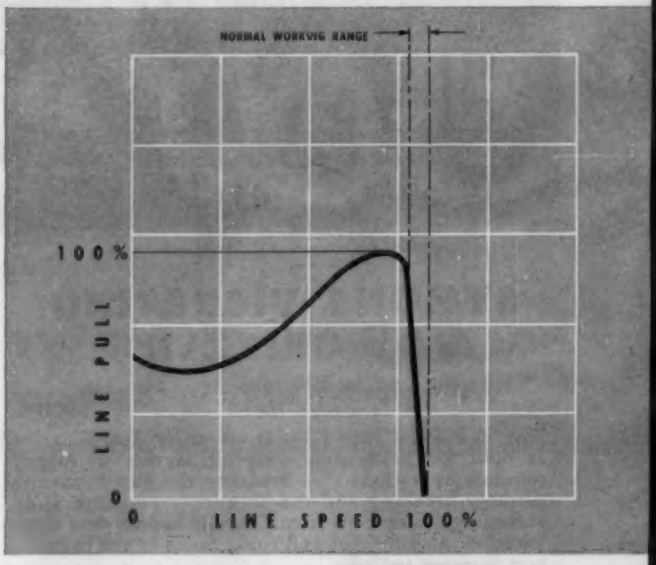



**Power Performance of LIMA'S New Optional Unit:**

A.C. Electric motor with torque converter drive [Diesel-torque converter curve (dotted line) shown for comparison]

With this drive, even under extreme loading, the motor will pull down in speed only a very small amount. It can never be stalled.

The line pull will constantly increase through a long pull down speed range, depending upon the load applied.




**Power Performance: A.C. Electric motor with direct drive**

The motor speed and torque varies as shown for line speed and pull.

With a pull down in speed of only 3% to 5%, torque rises too fast. The motor will stall quickly after peak torque is reached. Workable speed range is small, stalls are frequent.

BALDWIN BLH LIMA-HAMILTON

**LIMA** SHOVELS · CRANES DRAGLINES · PULLSHOVELS

***BALDWIN-LIMA-HAMILTON***

*Construction Equipment Division · LIMA · OHIO · U. S. A.*

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

# SYMONS VIBRATING BAR GRIZZLIES

*. . . up to 500 tons per hour*
*handling feeds ranging to power shovel size*

The SYMONS Type-K vibrating manganese Bar Grizzly is recommended for large tonnage *Scalping* of ore, rock or gravel. The powerful vibrating action of the Bar Grizzly makes it particularly effective for wet, sticky or gummy materials. The sloping, curved bars of the Symons Bar Grizzly tend to cascade the material as it passes over the screening surface. The tumbling action effectively assists in separating the undersize. Will handle feed sizes up to 30″ and larger.

For full details about the SYMONS BAR GRIZZLY, send for BULLETIN 121A.

# FOR HEAVY DUTY SCALPING SERVICE

For full details about the SYMONS ROD GRIZZLY, send for BULLETIN 207.

# SYMONS VIBRATING ROD GRIZZLIES

*. . . up to 500 tons per hour*
*for feeds up to 10″ — 12″*

The SYMONS Type-K—RG vibrating Rod Grizzly is built for heavy duty scalping service in large tonnage operations . . . bridging the gap between primary breaking and the secondary crushing and screening operations. It can readily handle dry, wet, sticky or gummy ores and rock. Some of the important features include:

Abrasion resistant heavy spring steel rod screening surface; Long lasting, low cost rods are easily adjusted or replaced; Effective, vigorous vibration provides thorough scalping; Amplitude of vibration can be quickly and easily changed to meet various operating conditions. Ideally suited for service following most sizes of primary crushers and scalping operations requiring relatively coarse separations in the range between 1″ to 4″.

S253

*SYMONS . . . A Registered Nordberg Trademark Known Throughout the World*

**NORDBERG MFG. CO., Milwaukee, Wisconsin**

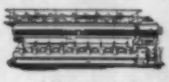
SYMONS GYRATORY CRUSHERS

SYMONS CONE CRUSHERS

MINE HOISTS

SYMONS "V" SCREENS

GRINDING MILLS



DIESEL ENGINES

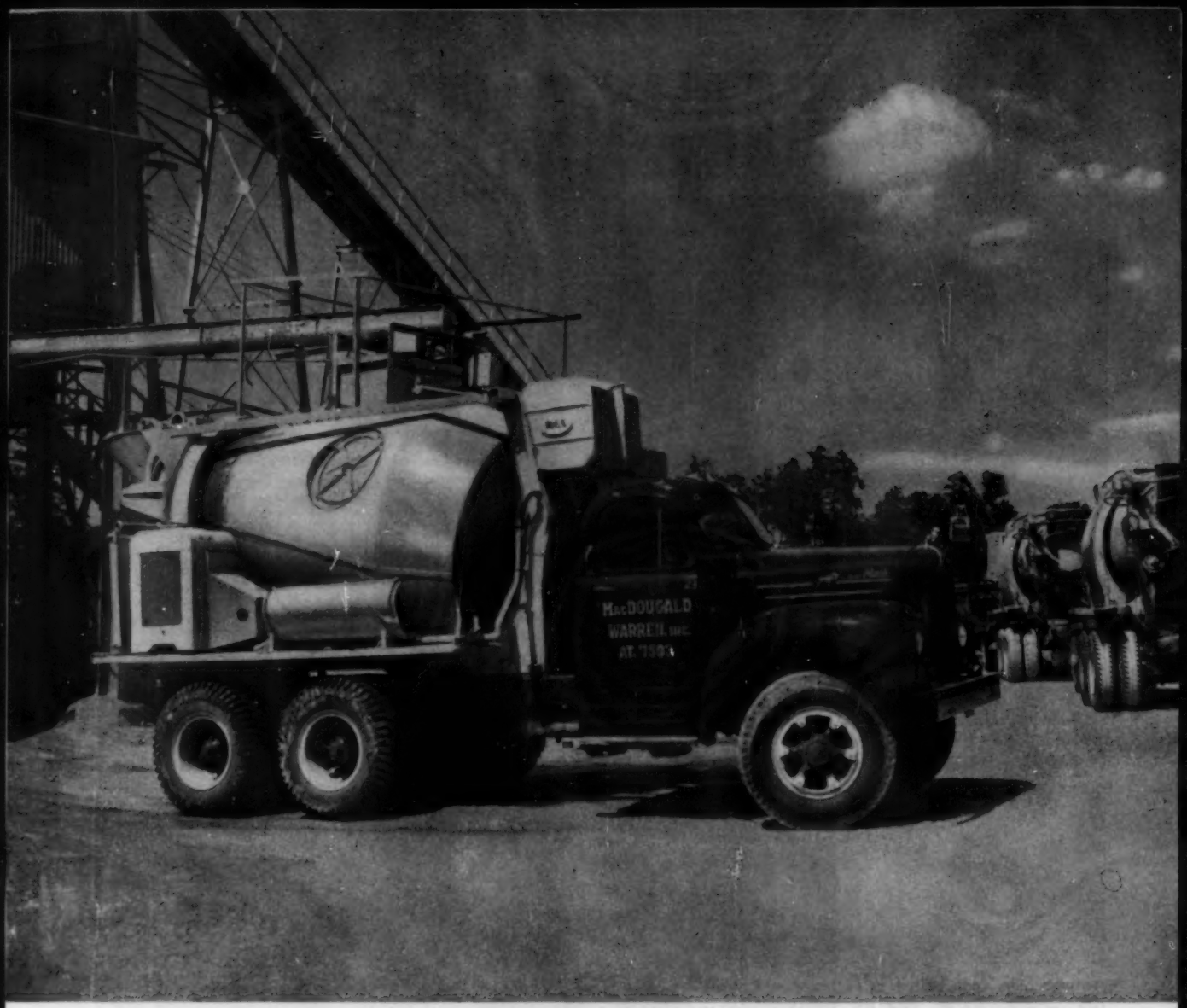
NORDBERG MACHINERY

**NORDBERG**

SYMONS SCREENS NORDBERG

MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS

NEW YORK • SAN FRANCISCO • DULUTH • WASHINGTON • TORONTO
MEXICO, D.F. • LONDON • PARIS • JOHANNESBURG




ATLANTA CONTRACTOR CALLS THEM...

# the mixer champs

Listen to Mr. E. J. Kelley, vice president and general manager of MacDougald-Warren, Inc., construction contractors of Atlanta, Ga., as he praises his new Mack B-42 six-wheeler concrete mix trucks.

"Throughout the Greater Atlanta area, which we serve," says Mr. Kelley, "no other trucks can measure up to Mack six-wheelers for mixer operation, both in heavy traffic and over rough ground. They're champs for economy and dependability because they're free from breakdowns on the job."

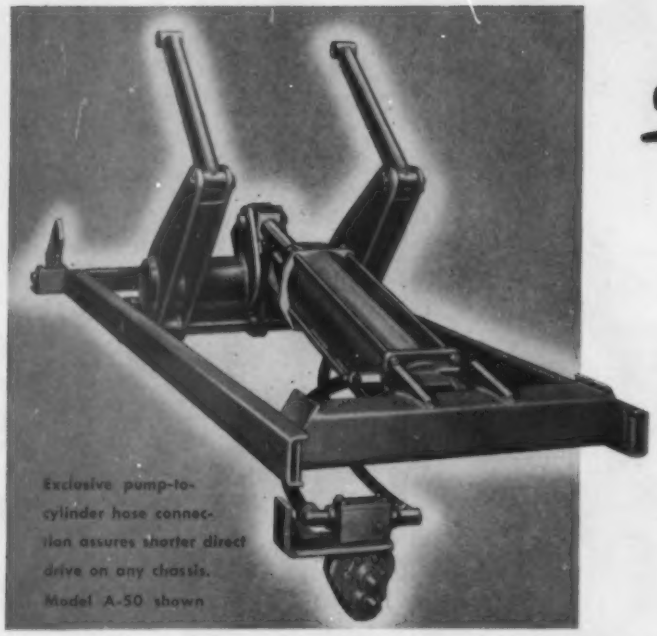
Wherever you go, you'll find plenty of prominent concrete mix operators like Mr. Kelley who swear by Macks. For trucks that will keep rolling under heavy payloads . . . in fast, uninterrupted schedules . . . take their tip and make greater profits with Macks.

**MACK TRUCKS** Empire State Building, New York 1, N. Y.

3025

# *Specify* HEAVY-DUTY HOISTS

## with revolutionary *Strong-Arm* DESIGN!



Exclusive pump-to-cylinder hose connection assures shorter direct drive on any chassis. Model A-50 shown

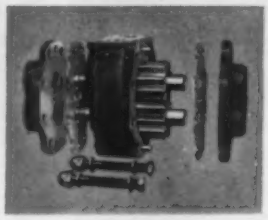
**Payload capacities in tons at body lengths shown**

| Body Lgth. | Standard Duty | | | Heavy Duty | | | | |
|---|---|---|---|---|---|---|---|---|
| | A-30 | A-40 | A-50 | A-60 | A-70 | A-90 | A-260 | A-270 |
| 8′ | 8 | | | | | | | |
| 9′ | | 8 | 10 | 12½ | | | | |
| 10′ | | 7 | 9 | 11 | 12 | 17½ | 22 | 27½ |
| 11′ | | 6 | 8 | 10 | 11 | 15½ | 20 | 24½ |
| 12′ | | | 7 | 9 | 10 | 14 | 18 | 22 |
| 13′ | | | | | 9 | 13 | 16 | 20 |
| 14′ | | | | | 8 | 12 | 15 | 18 |
| 15′ | | | | | | | 14 | 17 |
| 16′ | | | | | | | 13 | 16 |

### Newly Engineered for better performance, easier maintenance!

**Stronger, less dead-weight**

Unit construction of this rigid torque tube, with tubular lift arms, gives increased strength with less weight . . . also keeps hoist from binding or buckling, by insuring equal lift on both arms under all conditions.



**Improved hydraulic controls**

New laminated 10-tooth gear pump, with distortion-proof center-body and anti-friction bearings, assures smoother operation, longer life. "Non-creep" spool valve and aluminum PTO housing are "*plus*" advantages.

**Faster, cleaner dump**

New center-lift design, with 5° higher dumping angle and extra low cylinder mounting, gives better lifting leverage for faster dumping cycles, with less strain on hydraulic system. Built-in oil reservoir ends pump starving.

**Less down-time**

Exclusive new 3-piece tie-rod construction saves hours of expensive cylinder maintenance . . . also cuts repair costs because when one part wears, you replace only that part — NOT the complete assembly.

**NEW HEAVY-DUTY BODIES**

Perfect team-mates for the new A-50 and A-60 Strong-Arm hoists. Heavy-duty steel construction with rugged V-type side braces, full-length running boards, husky boxed tail-gate and heavy Z-shaped rear apron.

A free demonstration will quickly convince you that today's new GarWood "Strong-Arm" hoists give you *even more for your money* than former GarWood units, which have led the industry in sales year after year. For example, the new Strong-Arms give you up to 14% more capacity per dollar—*plus* increased operating efficiency, longer life, easier maintenance—*in both standard AND heavy-duty models.* You can order these new Strong-Arm lifts, with matching dump bodies, at your GarWood distributor or branch — *right now!*

See these great new *Strong-Arm* Hoists and Dump Bodies at your Gar Wood Distributor — TODAY!

GAR WOOD INDUSTRIES

**GAR WOOD INDUSTRIES, INC.**

Wayne, Michigan • Richmond, California

WORLD'S LARGEST MANUFACTURER OF HOISTS AND DUMP BODIES FOR TRUCKS AND TRAILERS

GW-H-2r

# Specification Stone

## ...at the flip of a switch

YOU'RE ALL SET TO MEET the rigid specifications of highway and other construction contracts with a *Hydrocone* crusher . . . the crusher that affords one-man, one-minute product control.

In this truly modern crusher, *Hydroset* control provides a rapid and convenient means of raising and lowering the hydraulically supported crushing mantle. Adjustment to precise product size can be accomplished by the flick of a switch. Compensation for wear can be done in the same manner. In addition, *Hydroset* control facilitates emptying crushing chamber in case of power failure or other emergency.

**Hydrocone CRUSHERS**

*For complete information, see your local A-C representative or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 07B7145B.*

## Produces a Cubical Product

The *Hydrocone* crusher also helps you meet specifications by producing a uniform, cubical product because of its small eccentric throw in relation to crusher setting. Fines, slivers and flats are kept to a minimum because of the smaller effective ratio of reduction during each crushing stroke. With a small eccentric throw, the open side setting is also smaller. This results in a smaller top size product.

*Hydrocone and Hydroset are Allis-Chalmers trademarks.* A-4653

**ALLIS-CHALMERS**

# Screenings

by Ray L. Smith, Jr.

GOT a Super Market Near You? You know what we mean . . . One of those gigantic wide-open grocery stores that offer groceries of all kinds as the main staple but may include everything from squirt guns to cultivators. (Yes, we've even heard of them handling boats.)

And super markets are successful, make no mistake about it. But it is this sour-pussed person's observation that they are only half as successful as they might be if they did not do one very important thing awfully wrong. Maybe not all of them do that one thing wrong, but about all that we have visited do it that way. We are speaking of their public relations . . . the impersonality, not to say rudeness or discourtesy, with which some of their clerks treat the buying customers. If those super market folks would only smile in a friendly fashion, not act bored and impatient when we have to ask where something is . . . if they would check us out in a hurry instead of completing phone conversations and gossip bees, they'd have another customer.

What brought all this on? Well, two or three visits to a brand new super market near us plus a visit to a near-by hardware store where a garden rake was dispensed with the deep frozen warmth of one whose nap has been interrupted. If the guy had only smiled, we'd have bought a hoe and a shovel too, but damned if we'll bore a shopkeeper that much.

Well, we feel better now that's off our chest. But anyhow, just for the heck of it, see that nothing like this happens around your establishment.

When the boss (your customer) comes in, treat him like a boss should be treated.

### Mambo Gravel

LOCAL outfit in this windy city of Chicago now makes maracas of plastic. Couldn't get the natural gourd sound until they stumbled on a special kind of Material Service gravel. Hence, the smallest order ever received by one of the world's largest suppliers . . . enough gravel to fill a shipment of maracas!

Seems that if the present Mambo Craze continues much longer, we'll all have to carry a special stockpile labeled "Mambo Gravel."

### Magic Soil

VERMICULITE gossips say that tabletop gardening without soil, is the newest activity opened to children by two hydroponics (soilless gardening) kits.

Everything needed to grow and landscape realistic garden scenes on a table top is included in the kits . . . fences, miniature trees and houses, and toy animals.

The "magic soil" in the kits is, of course, vermiculite, a mineral used as a soil conditioner in real-life gardens. Water, plant food, and seeds are added to the vermiculite. In a short time, the tabletop garden is alive with growing plants . . . a new and novel way to entertain and educate youngsters.

Might be good for those precious kids around your house.

### Potpourri and Succotash

Engineers can dream, too. George Sensibar of Construction Aggregates (which filled in parts of Outer Drive here in Chicago) not long ago wrote "Blue Dusk."

Two drunks were wandering along the railroad track.

"These are the longest stairs I ever saw."

"Yesh," said the second one, "but it's these low handrails that get me."

About the only golden opportunities some gents can recognize are blondes.

"Goodness, why is that man jumping about so frantically?" Asked a passer-by of a youth lounging on a lumber pile. "Oh, he's a deaf-and-dumb carpenter," replied the other, "and he's just hit his thumb with a hammer for the third time in the same place and he can't find his pad and pencil."

Groom: "How did you make this cake, dear?"

Bride: "Here's the recipe. I clipped it from a magazine."

Groom: "Are you sure you read the right side? The other side tells how to make a rock garden."

It was a bright Sunday afternoon in spring and the farm boy had his girl out for a buggy ride. As they jogged along through the wine-like air, he suddenly turned to the girl and said, "Mandy, will ye marry me?" "Shore will, Hiram," was the immediate response. They drove along in perfect silence for about a quarter-hour, then Mandy asked, "why don't ye say somethin', Hiram?" "Humph!" grunted the boy. "I've a'ready talked too damn much!"

Sailor and a girl were riding on horseback out in the country. As they stopped for a rest, the horses rubbed necks affectionately. "Ah, me," said the sailor, "that's what I'd like to do."

"Go ahead," said the girl. "It's your horse."

Druggist: "Well, Tim, did that mud-pack I suggested improve your wife's appearance?"

Tim: "It did for a couple of days, but then it wore off."

You can't measure a person's happiness by the amount of money he has. A man with ten million dollars may be no happier than one who has only nine million.

Papa Bear: "Somebody's been drinking my whisky."

Mama Bear: "Somebody's been drinking my gin."

Baby Bear: "Hic!"

Husband to friend: "My wife is two hours late. She's either had an accident with the car, been kidnapped, or she's shopping. Man, I hope she ain't shopping."

Troubled with noise in your car?
Our advice is to let her drive.

# "We Are More Than Pleased With The Operation of Eagle Equipment and Eagle Service"

THE plant of Valley Limestone & Gravel, Inc., Farmington, Iowa, has a compact Eagle Washing-Classifying-Dehydrating Section that is nearly as "automatic" as a modern clothes washer—except that they don't shut it down to load it. Floyd H. Millen, Vice President, states, "We are more than pleased with the operation of Eagle equipment and Eagle service". Eagle's user satisfaction policy lasts the life of the equipment.

Sand laden water passing through the screen goes to a 12' single Water Scalping-Classifying Tank equipped with POWER-OPERATED VALVES which eliminate need for constant watching or regulating. They assure removal of excess water and prevent build-up of material at any one bleeder valve in the bottom of the tank. "Snap action" of the valves provides rapid opening and closing, prevents bleeding of only water.

Material from the bleeder valves of the tank are gathered in a dual collecting-blending flume which feeds it to a 30" dia. x 25' Fine Material, Long Weir, Single Screw Washer-Classifier-Dehydrator. Material from second deck of screen is chuted to an Eagle 22" dia. x 15' Coarse Material Washer-Dewaterer.

Valley gets sparkling clean material to exact specifications. Another example of economical, profit-making equipment based on Eagle's years of experience and field study. Get the facts in Catalog 55.

## Power-Operated Valves Do The Trick

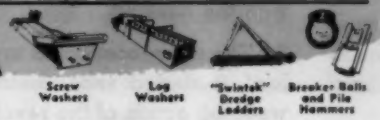
Eagle pioneered the Water Scalping-Classifying Tank outstanding in design and performance. NOW . . . another first . . . Power-Operated Valves on Eagle Tanks to assure uniform, continuous water scalping action and greatly improved classification. An important contribution to the Sand and Gravel Industry. Look into it! Now!

**EAGLE IRON WORKS**

133 Holcomb Ave., Des Moines, Iowa

EXPERIENCE-PROGRESS-SERVICE SINCE 1872

EAGLE IRON WORKS



Screw Washers | Log Washers | "Swintek" Dredge Ladders | Breaker Balls and Pile Hammers

# FLEXIDYNE

## THE DRY FLUID DRIVE

**DODGE of Mishawaka Announces An Entirely New Development in Industrial Power Drives that Promises to Revolutionize Drive Performance! Every Design Engineer and Plant Operating Man in America Will Want the Following Information.**

Here are the facts on how easily Flexidyne handles difficult starting problems, and gives a *new* kind of protection against shock and overloads.

While new in the United States, this drive has already been proved in thousands of installations in Europe. Dodge has redesigned it to American standards and now makes its dramatic advantages available to all industry.

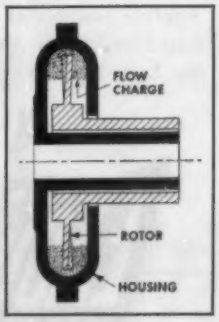
Flexidyne is a *dry fluid drive.* Its advantages over any other fluid-type drive are based on the fact that at normal operating conditions it *does not slip.*

### WHAT IT IS

The Flexidyne Drive is made up of a housing, inside of which a rotor is free to turn concentrically. Between the two are fine particles of spherical steel shot, called the "flow charge," which acts very much like a fluid. The flow charge transmits power from housing to rotor.

This flow charge is easy to seal in, has a high density and can stand relatively high temperatures. The use of this flow charge makes possible a design that is simple, compact, economical, and gives outstanding new and different operating characteristics.

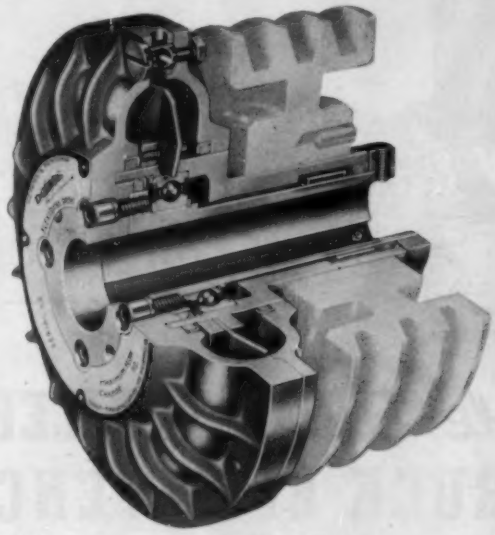
### HOW IT WORKS




1. The motor is connected to the housing, and starts it turning at no load.

2. The flow charge is thrown to the circumference of the housing, is compressed by centrifugal force, and revolves with the housing.

3. The rotor, connected to the load, is started and accelerated by the friction and wedging action of the revolving flow charge.



FLEXIDYNE DRIVE (with Taper-Lock Sheave in phantom).

4. Rotor and housing reach identical speeds—the Flexidyne operates with ZERO SLIPPAGE between motor and load at normal running speeds.

5. Before overloads cause damage, the Flexidyne rotor slips relative to the housing, overcoming the friction and wedging action of the flow charge. A thermal switch (optional) automatically cuts the electrical circuit if an overload persists.

6. The amount of the flow charge determines the torque capacity.

## WHAT IT DOES

The Flexidyne gives you the *exact* starting torque you need, for anything from the smoothest to the fastest start. Once the load reaches normal speed, there is zero slip, giving 100% efficiency. Also, it provides *accurate* overload protection, as it can be set to slip at any desired load. During starting and overload periods the current draw is at a minimum because with the standard Flexidyne setting the motor is never pulled down to less than 90% of synchronous speed.

All this is due to Flexidyne's completely new principle, which produces *constant torque* for a given input speed, regardless of the percentage of slip between the rotor and housing (which occurs only during starting or overload).

The Flexidyne is simple to select *off the shelf.* Each size has a standard horsepower rating and yet it is only a matter of minutes to vary the flow charge to give you your own *tailor-made torque* to suit the job.

With Flexidyne you get *uniform* performance regardless of changes in the surrounding temperature.

The Flexidyne has very long life and practically negligible maintenance. *Its simplicity guarantees its dependability.* Gas and diesel engines also benefit from all Flexidyne advantages.

Aside from Flexidyne's low first cost, low maintenance, and top efficiency, it permits the use of smaller, cheaper motors and controls with greatly reduced current demands and improved power factor. Its *smoother* starts and *gentler* overload protection avoid breakage and reduce maintenance on drives, gears, bearings and driven machinery.

## FLEXIDYNE COUPLINGS

Two lines will be available—*Flexidyne Drives,* for convenient mounting directly on motor shafts and adapted for Dodge Taper-Lock Sheaves, and *Flexidyne Couplings* with Taper-Lock Bushings, for straight line drives. Several thousands of these units of French design, in capacities ranging from fractional to thousands of horsepower, are now in use in Europe. Dodge will first offer — from stock — four sizes rated at 3 to 30 hp at 1800 rpm. Other sizes will follow.

Write now for special bulletin, delivery dates and application information.

**DODGE MANUFACTURING CORPORATION**
**4000 UNION STREET, MISHAWAKA, INDIANA**

***CALL THE TRANSMISSIONEER,*** your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

DODGE

of Mishawaka, Ind.

# Any Truck Can PULL More Than It Can Carry

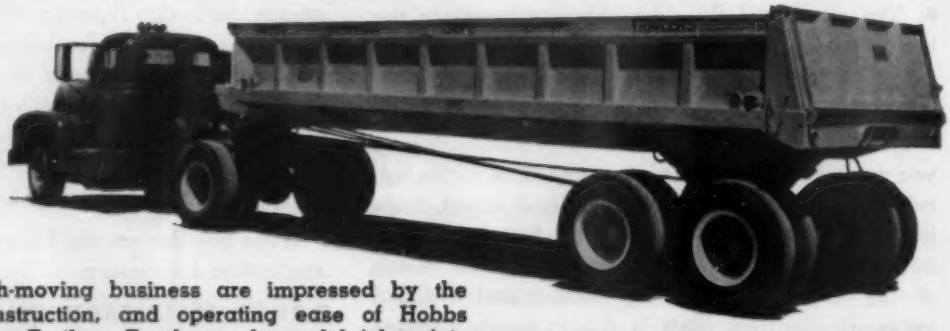
The use of a trailer to increase the hauling capacity of a truck is as simple as child's play. This principle enables your truck to PULL much more load than it could ever carry. Because of this . . .

# HOBBS *Schonrock Cable Dump* TRAILERS CAN TRIPLE YOUR TRUCK EFFICIENCY

A truck equipped with Hobbs Schonrock Cable Dump Trailer hauls three to four times as much dirt, sand, gravel or aggregate as one equipped with a dump body. The yard-mile SAVING is made even greater because the Hobbs Schonrock Cable Dump Trailer does away with heavy, expensive and intricate hydraulic lifting equipment. The simple, time-tested method of increasing power by means of block and tackle makes Hobbs Schonrock Cable Dump Trailer high in efficiency, low in cost, simple in maintenance.

- REDUCES MAINTENANCE AND FUEL COSTS
- PUSHES ITSELF OUT OF MUD
- DUMPS EASILY AT ANY ANGLE
- GREATER GROUND STABILITY
- AUTOMATIC TAIL GATE
- EASIER TO MANEUVER
- INCREASES YOUR PROFITS

*Permits full Advantage of Your State Bridge Formula Laws*



TANDEM AXLE MODEL

HOBBS TRAILERS

Men in the earth-moving business are impressed by the capacity, rugged construction, and operating ease of Hobbs Schonrock Cable Dump Trailers. Tandem axle model (above) is designed for legally hauling full gross load capacities. Single axle model (below right) provides fast delivery and easy maneuvering in close quarter operation. Batch gate permits multiple dumps.

***Distributorships Available***

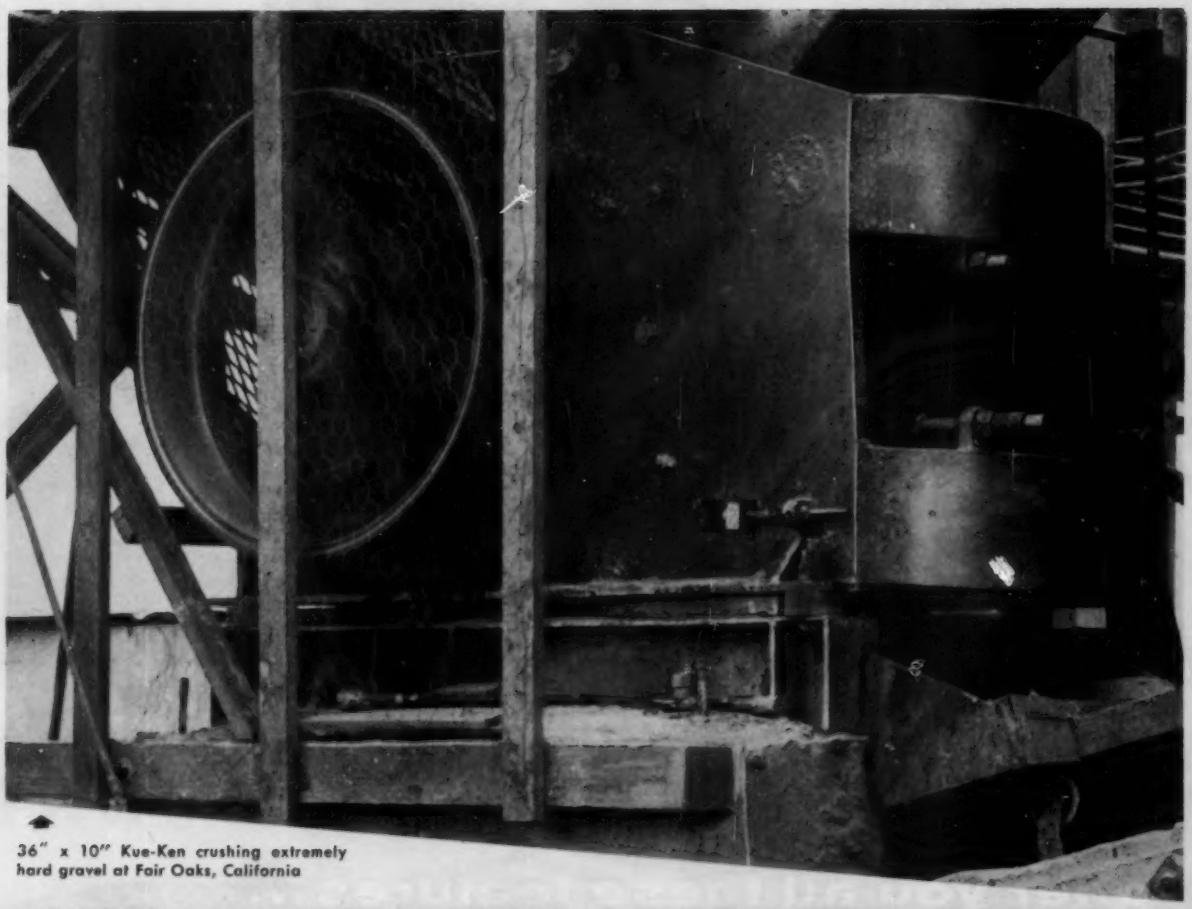
**WRITE, WIRE OR PHONE COLLECT**

SINGLE AXLE MODEL

## HOBBS MANUFACTURING CO.

609 North Main St. Fort Worth, Texas

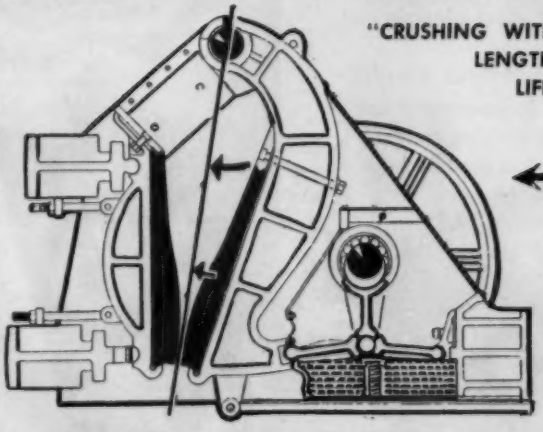
*Sales and Service also in Houston, San Antonio, Lubbock, Dallas, El Paso, Oklahoma City, Wichita, Kansas and Lincoln, Nebraska.*



36" x 10" Kue-Ken crushing extremely hard gravel at Fair Oaks, California

# KUE-KEN CRUSHER OPERATES ON LESS POWER...CRUSHES 25% to 50% MORE ROCK!

Kue-Ken saves you money with every stroke of its lightning-fast jaw! Built with exclusive and superior engineering features, Kue-Ken has 25% to 50% greater capacity, uses its power to crush rock rather than wear out jaw plates and has a crankcase-type lubrication system. Overload cannot damage Kue-Ken . . . safety device instantly releases flywheel. No broken flywheels or bent shafts — no broken frames or toggles — no burnt out belts or motors. Kue-Ken is the lowest priced crusher per ton capacity!



**"CRUSHING WITHOUT RUBBING" LENGTHENS JAW PLATE LIFE 5 TO 10 TIMES.**

See how the hinge pin is located on the center line of the crushing zone. The jaw moves in an almost straight line. Rock is instantly gripped and crushed without rubbing.

## KUE-KEN CRUSHERS

*"LOWEST COST-PER-TON CRUSHING"*

Jaw Crushers · Gyratory Crushers · Overhead Eccentric Crushers · Revolving Screens
Classifiers · Feeders · Rib Cone Ball Mills · Concentrating Tables · Vibrating Screens

• *Write for catalogs* •

**STRAUB MFG. CO., INC. 8382 BALDWIN • OAKLAND, CAL.**

DEALERS: **WASHINGTON MACHINERY CO.**, Seattle, Wash.; **LUND MACHINERY CO.**, Salt Lake City, Utah; **CLOSNER EQUIPMENT CO.**, San Antonio, Texas; **CONTRACTORS EQUIPMENT CO.**, Portland, Ore.; **GARLINGHOUSE BROS.**, Los Angeles, Calif.; **ANAHUAC MACHINERY CO.**, Mexico City, Mexico; **UNIVERSAL EQUIPMENT CO.**, Vancouver, B. C.

**Pennsylvania Crusher Co.**, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
**Armstrong Whitworth (Metal Industries) Ltd.**, Authorized Licensed Manufacturer and Distributor. Close Works, Gateshead-upon-Tyne 8, England

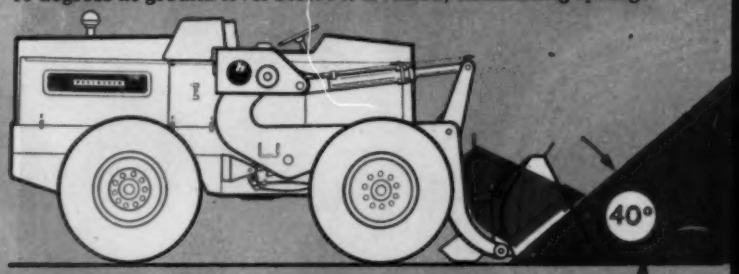
only these **2** completely different

**PAYLOADER®** TRACTOR-SHOVELS

offer you all these features...

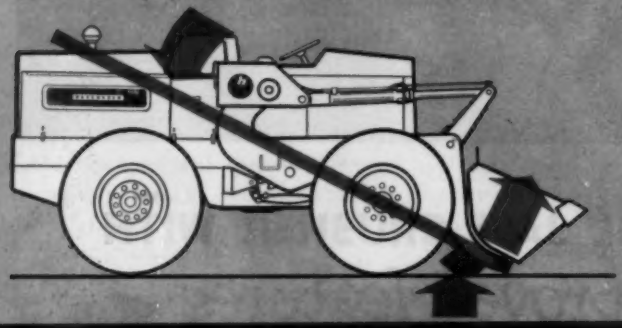
## 40 DEGREES BREAKOUT AT GROUND LEVEL

You can get HEAPED BUCKET LOADS and you get them FASTER and EASIER WITH THIS NEW BUCKET ACTION. Most important of all—you KEEP BIGGER PAYLOADS—because the bucket can be tipped back a full 40 degrees at ground level before it is raised, eliminating spillage.



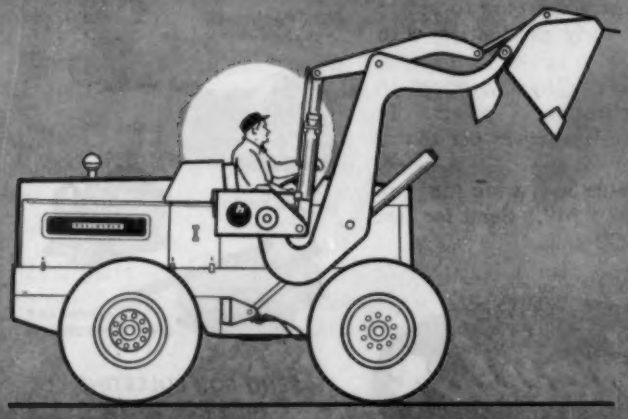

## POWERFUL PRY-OUT ACTION

Tremendous pry-out force is obtained by using the breakout pads on the ground as a fulcrum for leverage. The load forces opposing the pry-out action are thus transferred to the ground through the pads instead of to the axle, wheels and hydraulic system of the machine.



## SAFETY AND STABILITY

Underslung boom-arm design keeps moving members out of operator's reach at all positions—without using safety guards and screens. Longer wheel base and close, low, load-carry position provide maximum stability and balance.



## HOUGH-DESIGN
## HOUGH-QUALITY
## HOUGH-PERFORMANCE

### more horsepower

per bucket capacity than any other wheel tractor-shovel. Either gasoline or diesel power available.

### easy to operate

Fullest operator visibility for safe, fast maneuvering; power-steering; minimum number of control levers. Foam-rubber molded seat and back cushions. Seat adjustable for operator comfort. Longer wheelbase and better balance add to riding comfort.

### accessibility

Unusual accessibility for servicing and maintenance. Battery and oil reservoir are located under an easy-access cover just behind driver's seat. Sealed grease fittings. Exterior hydraulic line outlet provided for easy addition of hydraulically-operated accessories.

### torque-converter drive

in conjunction with 4-speed, full-reversing transmission provides precise, easy control and the widest possible range of speeds for both forward and reverse. Acts as a shock-absorber for the entire power train.

### other features

Closed, pressurized hydraulic system to keep dirt and air out of oil; powerful hydraulic brakes; double-acting hydraulic cylinders and chrome-plated piston rods; 12-volt electric systems on gas-powered models; forward and backup driving lights; tail lights.

THE FRANK G. HOUGH CO.
750 Sunnyside Ave., Libertyville, Ill.

Send me full information on the new model HH and HU "PAYLOADER" tractor-shovels

☐ Model HU–1 cu. yd. ☐ Model HH–1½ cu. yd.

Name.....

Title.....

Company.....

Street.....

City.....

State.....

SAY "HUFF"

# PAYLOADER®

MANUFACTURED BY
THE FRANK G. HOUGH CO. · LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

# A TRAYLOR ALL STEEL JAW CRUSHER WITH time-tested, job-proved features

## WILL SOLVE YOUR CRUSHING PROBLEM

A Traylor All Steel Jaw Crusher offers time-tested, job-proved advantages long preferred throughout the quarrying industry. Extra-heavy construction and exclusive design features combine to assure reduced down-time for maintenance, peak hourly production with fewer waste fines.

Original Traylor curved jaw plates assure a finer product in greater capacity through more efficient application of power. In fact, size for size Traylor jaw crushers require less power per ton of rock crushed than any other jaw crushers.

Traylor All Steel Jaw Crushers are available in a wide range of sizes with feed openings from 8″ x 12″ to 60″ x 84″. Send for free bulletin containing complete specifications and details.

**TRAYLOR ENGINEERING & MFG. CO.**
776 Mill St., Allentown, Pa.
Canadian Mfrs.: Canadian Vickers, Ltd., Montreal, P. Q.

A Traylor leads to greater profits

*SEND FOR BULLETINS*
*. . . just mention the Traylor Equipment that interests you.*

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AN IMPORTANT MESSAGE CONCERNING...

# A Basic Advance In Motor Insulation

ELECTRIC motor and generator insulation has come in for its share of announcements of "new" and "revolutionary" developments. But in spite of these announcements, inherent shortcomings of conventional insulation have remained.

There has been little basic improvement in motor insulating systems . . . UNTIL NOW.

Allis-Chalmers, working with engineers and scientists of Dow Corning Corporation, has developed *Silco-Flex* motor insulation . . . truly new in concept . . . truly new in effectiveness.

The *Silco-Flex* insulation system employs a pure silicone rubber combined with specially developed application techniques to produce an insulation unmatched by any other in use today. Outstanding improvements are shown in all these important characteristics:

***Homogeneity*** — The complete *Silco-Flex* coil insulation is vulcanized into a single piece with no joints, voids or splices which can develop into breaks in the insulation. Even the best of the new conventional insulations combine several dissimilar materials which are held together by binders.

***Heat Resistance*** — The excellent dielectric and mechanical properties in silicone rubber do not change significantly with aging at high temperatures over long periods of time.

***Moisture Resistance*** — Completely sealed, *Silco-Flex* insulated coils are the most moisture-resistant coils ever produced.

***Chemical Inertness*** — *Silco-Flex* insulation has outstanding resistance to most atmospheric contaminants, corona and weathering. It also withstands weak acids, alkalies and lubricants.

***Flexibility and Resilience*** — *Silco-Flex* insulation remains flexible and resilient indefinitely under operating conditions. It is especially resistant to mechanical abuse and to the stresses brought about by overloading and rapid starting and stopping. It is also amazingly resistant to abrasion.

***Heat Dissipation*** — Most electric insulators, unfortunately, are also heat insulators. *Silco-Flex* insulation, by comparison, is an excellent heat conductor and materially assists in removing heat from the coils.

## What Are the Benefits?

The characteristics of this new insulation are so remarkable that complete reappraisal of motor application practices and motor performance is indicated.

In *all* applications, the chemical, mechanical and electrical properties of *Silco-Flex* insulation insure increased service reliability and longer life.

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# New York Trap Rock

## Erects 1,000 T.P.H. Crushing Plant At Haverstraw to Serve New Quarry Level

another ON THE SPOT report

IN ITS 28-year history the Haverstraw plant of New York Trap Rock Corporation, located along the west bank of Hudson River about 40 miles north of New York City, has undergone several unique and interesting developments in expanding to its present 1,000 t.p.h. capacity. The most recent one, costing about $1,000,000, involved the erection of a new primary and secondary crushing station, built at grade with a third quarry level opened up a year ago. The new facility, incorporating a 56- by 72-in. jaw crusher —one of the largest of its kind in the crushed stone industry — has stepped up production by more than 20 percent (about 150,000 tons), thereby raising the Haverstraw operation to the 1,000,000-ton (yearly) class. Included in the expansion program was a ¼-mile long inclined belt conveyor which ties the new crusher to the old stone plant.

The Haverstraw plant, built in 1926-27, was the first downhill operation in the industry, making full use of the local topography. In the original plant setup (which is still functioning beyond the tertiary crushing station) the stone moved largely by gravity from the primary crusher at 400-ft. elevation through the various crushing and screening stages downhill to the river level—ready for loading into barges. The quarry was developed on the backslope of the picturesque Hudson Palisades, which rise about 500 ft. above the river at Haverstraw. The original primary crusher (a 48- by 60-in. jaw) was erected at grade with the quarry floor in order to facilitate the truck haulage operation.

In later years Trap Rock developed a second level (72-ft. face),

General view of the Harverstraw operation of New York Trap Rock Corporation, located along the Hudson River. On the left is the new 1000 t.p.h. primary crushing station and quarter-mile long conveyor, which connects to the old crushing and screening plant. The storage silos and dock are seen at the river front. On the right is the quarry and the specially-built ramp leading from the second level to the old primary crusher.

A 4-cu. yd. electric shovel loading a 10-ton side-dump trailer. Note the columnar jointing of the trap rock (diabase) formation, which makes drilling a difficult operation.

Secondary breakage is handled by a drop ball crane, operating on the third level.

These two views show the new primary crushing station (with elevated roadway) and new conveyor belt gallery. Note how the second conveyor (left) conforms to the topography.

and last year the third level was opened up. Presently the uppermost level is completely worked out (without destroying the natural river face of the Palisades), and the second level will be worked out in 1955. Plans call for the third bench to be 90 ft. in height, although at present the face is 70 ft.

The opening of the second level in 1939 necessitated trucking uphill to the primary crusher. For this operation a unique cable haulage was devised for obtaining maximum power out of the quarry trucks. Two separate 800-ft. long inclines were built on an 11 percent grade, each consisting of two sets of tracks, a pair of barney cars, and two roadways. Each pair of barney cars was connected by cable to two sheaves at the top of the ramp. A bumper on the front of the empty truck acted as a pusher on the barney car going down the hill, the other barney car contacting the rear axle of the loaded truck going up the hill. Thus the power of both trucks was used in transporting the load up the ramp to the crusher.

With the opening of the third level, it became necessary to relocate the primary crushing station. However, because the old primary crusher was inadequate for the greatly increased production at Haverstraw, the firm decided to install a larger crusher at the new site, the old crusher remaining in use until the changeover was complete.

The 56x72 jaw crusher, as well as two gyratory secondary crushers and related equipment for the new plant, were obtained from Trap Rock's Cold Spring plant, located across the Hudson from Haverstraw. This plant was dismantled and the machinery moved by trailer truck to the new location.

The new crushing facility, set up on a hillside adjacent to the quarry, is served by an elevated semi-circular concrete roadway, which is at grade with the third quarry level. Quarry trucks (side-dump trailers) enter at one end and leave at the other, thus effecting a highly efficient operation. This crusher also handles the second-level stone, access to the second level being by an 800-ft. long haul road built at 10 percent grade.

**Quarry** The trap rock quarried at Haverstraw is a tough, hard massive diabase rock of Upper Triassic age (part of the Newark series), which is characterized by columnar (closely spaced vertical) joints; it is one of the hardest rocks quarried in the industry.

Primary blast holes are drilled with four Bucyrus-Erie electric well drills (three 42T's and one 29T), putting down 9¼-in. holes in a 24- x 23-ft. pattern. Du Pont 9-in. explosives are used, which are detonated with Primacord, and delayed by Du Pont millisecond connectors. To guard

One of the side-dump trailers discharging its load into the primary crusher feeder.

A workman operates the primary crusher feeder from this comfortable vantage point. Note the large hook used for hang-up blocks.

View of the flywheel of the 56- by 72-in. jaw crusher.

Left to right: William Ferguson; Edward Sullivan, superintendent at Haverstraw; and John C. Kringel, assistant to the vice-president in charge of operations of the Trap Rock firm. The driver is Fred De Groat.

against possible misfiring, a double Primacord trunk line, tied together with cross-lines, is used. All shots are single row.

Quarry excavation is handled by three Bucyrus-Erie 100B electric shovels, mounting 4-cu. yd. dippers. A fleet of 15 Easton TR-10 side-dump trailers, carrying 10-cu. yd. loads, hauls to the crusher. (These have been in use for several years.) The haulage units which work the second level are equipped with special Bendix-Westinghouse heavy-duty air brakes, in view of the steep grade of the haul road.

**Primary Crusher** The loads are side-dumped into a 25-cu. yd. hopper mounted over a Traylor 6- by 16-ft. apron feeder, which feeds the Traylor 5672 jaw crusher. A 20-hp. motor drives the feeder, while a 250-hp. motor drives the jaw crusher through a flat belt. The jaw crusher, set with an 11½-in. opening, discharges to a pair of No. 30 Traylor gyratory crushers; each is driven by a 200-hp. motor and set at a 3-in. opening. Both gyratory crushers discharge to a 48-in. by 50-ft. belt conveyor which feeds the long inclined conveyor leading to the old stone plant.

This is a two-stage conveyor, consisting first of a 36-in. by 486-ft. unit, followed by a 36-in. by 650-ft. unit, each driven by a 150-hp. motor. The first conveyor has a belt speed of 490 f.p.m., the second 520 f.p.m. Both conveyors are housed in steel galleries covered with corrugated steel sheathing (except the first 100 ft. of the first conveyor, which is housed in a concrete tunnel). The second conveyor is curved to conform to the topography (see photo on p. 77).

**Old Stone Plant** From the discharge end of the 650-ft. conveyor, the stone begins its downhill journey to the loading-out dock. At the third stage crushing station, the stone is first sized by a pair of 5- by 16-ft. revolving screens, fitted with two jackets. Oversize stone (plus 3¼-in. round) is chuted to three No. 10 McCully gyratories, for tertiary reduction, which produce minus 1¾-in. stone. This product, as well as the minus 3¼-in. stone, is conveyed separately (on 30-in. belts) to the fourth-stage crushing and screening department. In wet weather, material through the outer jacket (minus ¾-in.) is fed to a Tyler-Hum-mer screen to take out the minus ¼-in. material, which is sold for fill or stockpiled for future sale.

The minus 3¼-in. stone is fed to a Gyrex 4- by 8½-ft. single-deck screen, which produces 2½-in. stone; the gyratory crusher products, on the other hand, are sized by a pair of 5- by 16-ft. revolving screens, producing 2¼-in. stone. Oversize stone from these three screens joins and is fed to two 4-ft. Symons cone crushers, which are operated in closed circuit with a pair of Allis-Chalmers 5- by 10-ft. vibrating screens, the latter also producing minus 2-in. material. Two concrete silos and a two-compartment concrete bin are used to store the desired product. These discharge to a 30-in. by 789-ft. belt conveyor leading to the river-front screening plant; this conveyor passes through a tunnel beneath highway 9W and in a gallery over the West Shore Division of the New York Central Railroad.

The screen-house is equipped with

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Large tires give excellent flotation and traction on wet surfaces and uneven terrain. The DW20 has clutch and steering boosters and air brakes to minimize operator fatigue. Matched with the No. 20 Scraper, it makes a balanced, easy-handling unit. The No. 20 Scraper takes on its full load of 20 cu. yd. (23 cu. yd. with sideboards) quickly, with a live, boiling action. Top-of-bowl design is clean and uncluttered for good operator visibility and efficient shovel loading.

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View of the 36-in. by 486-ft. belt conveyor issuing from the new crushing plant.

This view shows the head end of new conveyor and the old stone plant. In the foreground is the fourth-stage crushing station, with bins for storing minus 2¼-in. stone.

18 vibrating screens (including 4- by 10-ft., 4- by 16-ft., and 5- by 16-ft. units), which are mounted above a battery of seven 1,500-ton concrete silos. The major finished products include 2½-, 1½-, 1¼-, ¾-, ⅝-, ⅜-, ¼-, screenings, and stone sand. The latter is produced from the screenings in a Dorr 12-ft. scoop-type classifier and stored in an open stockpile. Special blends are also produced on a reversible blending belt conveyor (30-in. size) installed beneath the silos. Before being loaded, all stone is washed in a cascade-type washer, from which it can be conveyed either to the barges or to seven 120-ton truck-loading silos.

There is also a recrushing circuit at the dock-site, consisting of a Symons 4-ft. shorthead cone crusher operated in closed circuit with an Allis-Chalmers 5- by 12-ft. Low Head screen. The screen throughs are returned by bucket elevator to the screening department.

The new crushing plant at Haverstraw, which began operation in the early summer of 1954, was engineered and designed by the Trap Rock staff. The Nicholson Company of New York contracted the dismantling of the Cold Spring plant and the erection of the crushing plant and new conveyor system at Haverstraw.

Officers of the New York Trap Rock Corp. are Wilson P. Foss Jr., chairman of the board of directors; Wilson P. Foss III, president; Joseph Diehl Fackenthal, executive vice-president and counsel; Gerald M. Boyle, vice-president in charge of sales; F. J. Buffington, vice-president in charge of operations; and Eliot K. Bartholomew, treasurer. M. C. Dow is chief engineer, John R. Kringel is assistant to Mr. Buffington, Clarence Stetser is general superintendent, and Edward Sullivan is superintendent at Haverstraw.

New York Trap Rock Corp., in its 36th year of operation, also operates three other Hudson River plants, located at Clinton Point (crushed dolomite), Tomkins Cove (crushed dolomite), and Verplanck (crushed and pulverized limestone). Annual production currently exceeds 5,000,000 tons. About 90 percent of this output is used in highway construction. Movement of Trap Rock products in the company's fleet of 200 barges accounts for one-third of the tonnage moving on the Hudson River. The company employs over 750 men.


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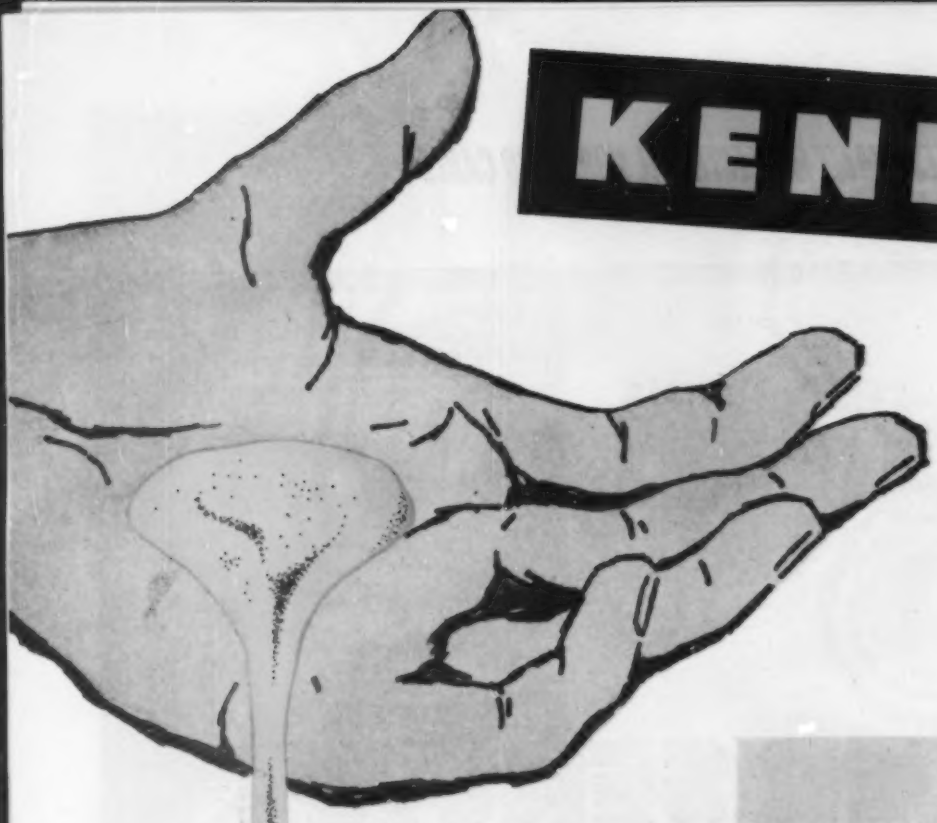

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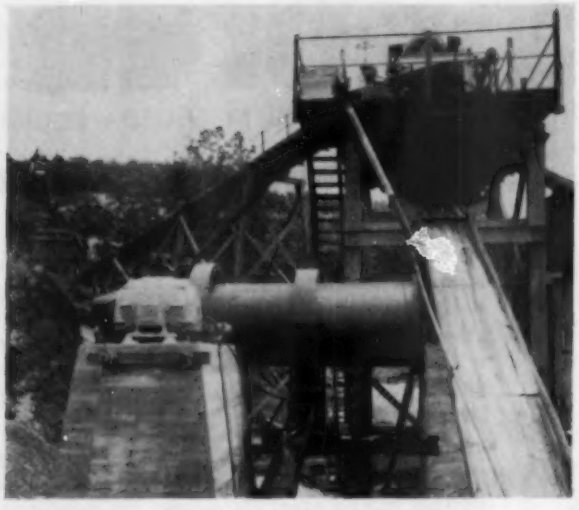

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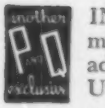
# Canadian Institute of Mining and Metallurgy Meets at Toronto




IN record numbers mining men from all parts of Canada and many parts of the United States crowded Toronto's hotels on April 18, 19, and 20 for the 57th annual general meeting of the Canadian Institute of Mining and Metallurgy in the Royal York hotel. Total registration was 1,850 — 1,368 men and 482 ladies.

Alfred L. Penhale, president of Asbestos Corporation, Limited, Thetford Mines, Quebec, was elected president of the institute for 1955-56. Mr. Penhale has had a lifelong association with the Canadian asbestos industry. His grandfather and father built the first asbestos mill in the world at Black Lake, Que., in 1888.

Prominent among visitors from the United States was H. De Witt Smith, president of the American Institute of Mining and Metallurgical Engineers. Mr. Smith was guest speaker at the welcoming luncheon on Monday and brought greetings from the A.I.M.E.

Guest speaker at the annual dinner of the institute on April 19 was Dr. Richard L. Hearn, chairman of The Hydro-Electric Power Commission of Ontario. He stated that Ontario's future supply of power will have to come from the atom. The Commission has now used up all the power available from Niagara Falls, and by 1962 it will have used up all the power available from the St. Lawrence River development as well. He said that was the reason that Ontario Hydro has already started on its atomic power program, which will depend on uranium as the source of energy.

The program of technical papers covered the Canadian mineral industry from asbestos to zinc, and recorded the amazing growth and development that is taking place. One of the highlights of the program was the symposium on a great new Canadian enterprise—the development of the Sherritt Gordon nickel-copper-cobalt deposits at Lynn Lake, Manitoba, which led to the erection of the company's great metallurgical plant at Fort Saskatchewan, near Edmonton, Alberta.

Institute honors for scientific achievement were presented at the annual dinner. At the same time, the institute's Medal for Bravery was awarded to John Luca, a timberman from the Pioneer Mine, B. C.

The Selwyn G. Blaylock Medal was awarded to Jules R. Timmins for the major part he played in the development of the Labrador iron mines.

The medal of the International Nickel Company was presented to Professor Frank R. Forward of the University of British Columbia for "outstanding achievement in the treating of metalliferous ores."

The Barlow Memorial Prize went to Professor Nordau R. Goodman of Dalhousie University for his paper on the gypsum deposits of Nova Scotia.

The president's gold medal for the best student essay was awarded to D. J. Straw for his survey of the world's resources of asbestos.

At the business meeting of the Industrial Minerals Division V. A. Haw, Mines Branch, Ottawa, was elected chairman for 1955-56, succeeding J. E. Gillespie. D. F. Hewitt, Ontario Department of Mines, Toronto, was elected vice-chairman, and R. A. Wyman, Mines Branch, Ottawa, was named secretary-treasurer.

The technical program of the Industrial Minerals Division included papers on asbestos, talc and soapstone, nepheline syenite, limestone, roof bolting, rock removal, and drilling and blasting.

H. O. Olsen, general superintendent, Bethlehem Mines Corporation, described the methods employed in removing 20,000,000 tons of limestone at exceptionally low cost from the magnetite orebody at the Marmora Mine.

J. H. Morgan in his paper *Talc and Soapstone Deposits of Baker Talc Limited, Potton Township, Quebec,* outlined the uses for talc and described the geology of the deposits, which are 80 miles southeast of Montreal near the Quebec-Vermont boundary. The company owning them is one of three Canadian talc producers. Talc, the softest mineral known, and one of the most versatile, is used in pulverized form as a filler in a wide variety of products, as an insecticide carrier, in paints, as a substance to prevent roofing papers, rubber goods, cables, etc. from sticking together, and as talcum powder. In solid form it is used for lining certain types of furnaces, for laboratory table tops, and for many other purposes.

Talc and soapstone occur in dykes as an alteration product of serpentine. Widths of alteration to talc and soapstone vary widely, up to the maximum of 70 ft. The alteration is zoned and appears to be due to a combination of shearing movements

A. L. Penhale

R. A. Wyman

and chemical action. Crystals of magnesite are disseminated through much of the talc, and stringers of ferruginous dolomite and needle-like crystals of actiolite also are present. The wall rock is usually quartz-sericite-chlorite schist.

The talc is mined through tunnels driven into the hillside. A type of room-and-pillar mining, with short raises, is used. Soapstone, massive talc, and schistose talc are mined selectively and removed from the mine as soon as blasted in order to keep them dry, because moisture lowers milling efficiency.

Milling involves crushing to minus 3 in. in a jaw crusher and to minus one in. in a hammermill. Fine grinding is done in a Williams airswept roller mill, and classification is accomplished in a cone classifier. Oversize is returned to the roller mill, and the fines go to a cyclone in closed circuit with the roller mill. The product is bagged by a Bates automatic bagger.

The only producing deposit of nepheline syenite on this continent was described by D. R. Derry and C. V. G. Phipps in their paper—*The Geology of the Nepheline Syenite Deposit, Blue Mountain, Ontario.* They told how geological factors affect the exploration for and the development and mining of the nepheline syenite. The deposit described is owned by American Nepheline, Limited, and is situated at the base of Blue Mountain, 18 miles northeast of the village of Lakefield. The nepheline syenite is currently being milled at the rate of over 500 tons per day and the ground products are marketed with the glass and pottery industries in the United States and Canada.

The nepheline syenite, 1,000 to 1,200 ft. thick, forms a part of a highly altered series of sediments of Precambrian age. This series has been folded into a series of anticlines and synclines, and in places the nepheline syenite has been granitized and also intruded by other rocks. The syenite can be traced for several miles along the strike but it varies from pure nepheline syenite to feldspathic or biotite gneiss carrying only minor quantities of nepheline. Geological study supplemented by diamond drilling is necessary in the selection of quarry sites.

In picking a quarry site the first step is reconnaissance mapping to outline a ridge of rock that appears to be of desirable composition and is sufficiently large and high enough

V. A. Haw

above swamp or lake level to make quarrying feasible. Once a ridge has been selected as a potential quarry site, it is geologically mapped in detail and contoured. If no unfavorable features are observed as a result of the mapping, diamond drilling is commenced. In some cases a few reconnaissance holes are drilled to give a rough idea of reserves, but before quarrying is commenced a series of holes is drilled on 100- to 200-ft. lines at right angles to the strike. In common with most mineral deposits where the ratio between value and volume is low, diamond drilling is used not primarily to find ore but to test grade and insure that there are no inclusions of waste large enough to render the whole block unprofitable.

When a block of syenite of satisfactory size has been proved by drilling to be of desirable grade, the overburden is stripped off and the first cut is started. A maximum bench height of 40 ft. is used, and benches are advanced along the strike. Once a bench has been advanced 200 ft. or so, a second level is commonly started and advanced to maintain a 200-ft. interval between benches. Rock is loaded into trucks by a mechanical shovel and transported to storage or to the mill.

In *Asbestos Mining at Cassiar, B. C.*, N. F. E. Murray, mine superintendent, described operations at Canada's most northern asbestos mine and referred to some of the problems encountered in mining in the permafrost. The Cassiar chrysotile asbestos deposit is at the top of McDame Mountain in Northern British Columbia, at an elevation of 6,000 ft. above sea level. It was long known to trappers and hunters as a favorite summer haunt of mountain sheep which bedded down in the fluffy asbestos talus covering the deposit. The development of the deposit followed the opening of the Alaska Highway to which it is connected by a winding 87-mile road.

The mill and the townsite are in a valley at an elevation of 3,500 ft., and a 5½-mile road has been built from the mill to the deposit at the top of the mountain. The ground at the top of the mountain is permanently frozen and is traversed by seams of ice from a fraction of an inch to more than a foot in thickness. Mining in such ground poses some problems. In drilling, which is done with wagon drills, no water is used; but even so the steel cannot be left in the hole, as it might freeze to the walls. Frequent cleaning of the hole with a blast of compressed air is necessary, as the asbestos fiber wraps itself around the drill rods and binds them in the hole. Explosives must be loaded in a hole immediately after it has been completed because the diameter of the hole rapidly decreases, owing to re-freezing of the ice melted by the drilling. If after firing a round the ground is only shaken instead of being completely dislodged, it will re-solidify and will require re-drilling and re-blasting in order to recover the ore. To prevent this the ore is loaded on trucks as soon as possible after blasting. Fifteen-ft. benches are developed in the quarry.

Broken rock is at present taken down the steep face of the mountain by a steel chute semi-circular in section and 44 in. in diameter. Trucks take the rock from the end of the chute to the mill, where it is placed in a stockpile, milled, or dried and placed in dry-rock storage. The chute, which has an average daily capacity of 900 tons, is being replaced by an aerial tramway designed to transport 100 t.p.h. This tramway, which will be slightly over three miles in length, will transport men and supplies, as well as ore, and will permit lengthening of the quarrying season considerably by providing access to the quarry when the road would be blocked with snow.

The mill has a capacity of 500 tons per day and is similar to other asbestos mills. However, it differs in one important essential. Only spinning fiber (3K) and shingle fiber (4K) are produced in addition to crude. All the shorter grades of fiber are sent to the dump. This is because

of the high transportation costs of getting the fiber to the market. It is a very high-grade fiber and has an exceptionally low iron content. It meets all requirements of the United States National Stockpile specifications.

*Heat Treatment of Crysotile Asbestos Fibres*, an address by M. S. Badollet and W. C. Streib of Johns-Manville Products Corporation, Manville, N. J., was another in the valuable series of papers on asbestos research which Mr. Badollet has been presenting over a number of years before the Canadian Institute of Mining and Metallurgy. In this paper a description was given of a commercial process developed to control the texture of chrysotile asbestos fibers so that the properties could be changed at will, and silky spinning fiber could be changed to a semi-harsh fiber desired in the manufacture of asbestos-cement products. The process employs flash heating to remove a portion of the molecular water. The heat-treated fibers show an improvement in filterability, an increase in bulk, absorption, and surface area, as well as better electrical properties, such as volume resistivity.

This process, which was utilized in a pilot plant at the rate of 2 t.p.h. for several years, allows the mill operator to control his product and produce any desired texture for fibers grading from Group 3 to Group 7 at nominal additional cost. The tensile strength of heat-treated fibers is slightly decreased by the treatment, but this is a minor disadvantage; and the strength of the product is equal to that made from natural semi-harsh to harsh fibers.

Some staggering figures on the use of air in asbestos milling were given by H. Rozovsky, ventilation engineer at the new mill of Canadian Johns-Manville Company at Asbestos, Quebec, in his paper entitled *Application of Air to Asbestos Milling*. This mill, largest single asbestos mill in the world, is capable of handling over 14,000 tons of ore per day, and requires the minimum of 2,500,000 cu. ft. of air per minute, or about 10 tons of air for each ton of ore milled. The entire 12th floor of the mill is given over to fans and filters. This floor covers an acre of space, and its equipment insures a complete change of air throughout the entire mill about once every five minutes.

The separation of asbestos fiber from its ore, the opening up and cleaning of the fiber, and finally its blending and grading are done by a dry process and by mechanical means. Fiber released from the rock by impact is separated on reciprocating screens and is picked up by suction hoods and dropped out of the air stream in cyclone collectors, from which it is sent to fiber openers for opening and cleaning. It takes only 20 minutes for waste to reach the tailings belt from the time the asbestos-bearing rock enters the mill. In practically all phases of the operation, air is used to transport and separate fiber, and to control dust. About 55 percent of all the air required in the mill is for lifting the fiber off the screens by suction hoods. Another 20 percent of the mill air passes through dust control systems.

Large amounts of air are removed from the bagging floor by dust control systems around the packing units. This would normally cause air to be drawn in from outdoors through trucking doors and other openings. To replace this air and to prevent serious drops in temperature, a 6-ft. diameter pipe feeds clean air directly above the bagging floor. This inflow of air also helps to cool the motors and pumps used in operating the pressure packers.

The author stated that perhaps the most noteworthy feature of the air system is that the complete air handling of its many individual systems is operated by one pressure, developed in a central fan and filter room.

A symposium on roof bolting was held at a point session of the Industrial Minerals, Coal, and Metal Mining divisions. The experience with roof bolting at five mines was presented, and a summary of experience in this field was given in conclusion by Edward Thomas, a specialist in roof control with the United States Bureau of Mines. The practice of roof bolting has been in effect in Canadian mines for only a relatively short time, but it is coming into increasing favor.

After the meeting a large number of delegates went on pre-arranged all-day tours to the gypsum mine and plants of Gypsum, Lime and Alabastine, Canada, Limited, at Caledonia, the chemical plants of North American Cyanamid at Niagara Falls and Port Robinson, the sulphur and iron operation of Noranda Mines Limited at Port Robinson.

## Permanente Sales, Profits For 1954 Hit New Highs As Production Increases

Permanente Cement Company recently reported a record high for sales and earnings in its 1954 annual report to stockholders. Henry J. Kaiser, chairman of the board and president, indicated that the principal contributing factor to the record year was increased sales volume made possible by the company's expanded production and distributing facilities.

Earnings after federal income taxes for the fiscal year ending January 31, 1955, were $5,054,000, or $1.80 a share, compared with $4,311,000, or $1.54 a share in 1953—a gain of 17 percent.

On January 31, 1955, Permanente had 3,671 stockholders, an increase of 26 percent over 1953.

Dividends, including a year-end extra of 12½ cents a share, totaled 90 cents a share for the 1954 fiscal year, compared with 77½ cents for 1953—a gain of 16 percent—on the 2,800,000 shares currently outstanding. In addition, a 100 percent stock dividend amounting to a share-for-share stock split was made on July 30, 1954. Sales and operating revenues of $39,557,000 were 15 percent above the previous record of $34,323,000, established in 1953.

Some of the more important projects were: Completion of the $3,200,000 gypsum products plant in Seattle; acquisition of a new $2,700,000 high-speed 10,800-ton ship with self-contained ore-handling machinery; a $200,000 expansion and modernization of existing facilities at the San Marcos Island gypsum quarry; 25 additional truck and trailer units for Permanente's light-weight truck delivery fleet; new quarry machinery at the Permanente plant.

### New Eastern Corporation To Produce Expanded Shale

Northern Lightweight Aggregates, Inc., a newly-formed corporation, has selected a 185-acre tract near Cohoes, N. Y., for the location of its $500,000 plant. Its product will be expanded lightweight shale for concrete block.

Officials stated that this location had been chosen because of the deposit of shale on the site and because transportation facilities are available by rail, highway and barge.

Willis F. Bronkie, mining engineer of Poultney, Vt., is president of the firm. Other officers include the following: Joseph J. Fox, vice-president; Alfred D. Clark, secretary; and Arnold Cogswell, treasurer.

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CLAUDE E. HARPER, vice-president and general manager of the Kaiser Gypsum Co., is the newly-elected Gypsum Assn. president.

# Report on Current Labor Developments

**By S. HERBERT UNTERBERGER**
S. Herbert Unterberger and Company
Industrial and Labor Economists
Washington, D. C. - Philadelphia, Pa.

BACK in 1953 the brand-new Eisenhower Administration tried to control what it regarded as inflationary tendencies by using fiscal controls, principally by tinkering with the interest rates, but it utilized other weapons as well.

Economists are still debating how much effect those actions had on the recession which began in 1953 and continued well into 1954. But the politicians have few questions about it. The Republicans who were swept out of office in the 1954 election place a large part of the blame for their defeat on these deflationary actions, while the Democrats who often to their own surprise won those offices admit—in their more candid moments—that this attempt to direct the economy had something to do with their success.

Again in 1955 the Administration is worrying about inflationary tendencies. Not that the price level has been rising rapidly; it has been remarkably steady for many months. However, there are developments in some areas that worry them. The stock market situation is one of them, easy credit on home purchases is another, and the ease of obtaining large installment loans is a third. How to control these worrisome areas without affecting the whole economy is the problem.

Having been badly burned once, the Administration is trying to be cautious this time. The stock market problem has been attacked directly by raising the margin requirements twice. It is recognized that this does not really prevent the flow of large amounts of credit into the stock market because while spectators may not be able to buy large amounts on margin, there is nothing to prevent them from borrowing directly from banks and using their stock as collateral. So far, at least, many banks have been willing to advance a far higher percent of the market value of the stock than the margin requirement permits. It is hoped, of course, that the action on margins will act as a warning to the banks and thereby encourage them to follow a more conservative policy. So far, the banks do not seem to have heeded the warning.

Some attempts have also been made to attack the home mortgage loan problem. Thus far, they have taken the form of requiring buyers with V.A. mortgages to put up some small amount in cash—at least the settlement costs. V.A. appraisals had become so liberal that in some cases the mortgages were sufficient to cover all costs, so that, at the closing, the buyer received his deposit back.

This has been the extent of activity in this area to date. However, menacing sounds have been heard in Washington about tightening up on home mortgages, raising interest rates, requiring larger down payments, etc. It is unlikely that any substantial action will be taken along these lines, particularly in the upcoming election year. It is well known that construction activity is a principal support of the current prosperity and that this industry did much to prevent the recent recession from getting too serious. Any action which might curtail construction activity will, no doubt, be considered very carefully. Furthermore, there is a current notion that a home owner is more likely to be a Republican voter than an apartment dweller.

With regard to installment loans, no direct action has been taken. As a matter of fact, there is some question as to whether the Administration has any authority to take such action except in an emergency period. However, the general efforts to raise the interest rate may affect installment loans as well.

These efforts have taken the form of raising the rediscount rates; that is, the rate at which member banks borrow from their Federal Reserve banks. The raise was from 1.5 to 1.75 percent. This is not as high as the 2 percent rate instituted in January, 1953, which continued for more than a year. Afterward the rate was reduced hastily in February, 1954, to 1.75 percent and again in April, 1954, to 1.5 percent, where it remained until the recent rise.

Also, despite the fact that business is expanding and more money and credit is generally required to carry on the increased volume of transactions, the Federal Reserve has stopped buying government securities, which is one of the methods it uses to pump new money and credit into the system. This, too, will have a tightening-up effect.

Finally, the rate that the government pays for money is being raised. Since government loans are essentially riskless investments, when their interest rises, all other interest rates which involve some element of risk are almost sure to rise as well. The Secretary of the Treasury is inviting the holders of Treasury certificates totalling $3,900,000,000 paying 1.125 percent interest to exchange them for 15-month notes paying 2 percent interest. This is more than a 40 percent increase in the price which the government is paying for money. He is also offering an additional $2,500,000,000 in these notes to pay off other other maturing loans.

The question being asked in Washington is, "Will even this mild anti-inflationary activity have serious effects on business recovery?" The most eloquent answer was given by Allan Sproul, president of the Federal Reserve Bank of New York, who stated in a recent speech:

"We fear deflation more than inflation, just as do most people who are aware of the human aspects of economic forces and the human suffering which is involved in both of these deviations from economic well being. If, at times, we apply measures of restraint to a bubbling economic situation, it is because that is one of the reasons for our being—to try, during periods of high prosperity, to help prevent the excesses which will bring such periods to a destructive end.

"I might even go beyond that position, and say that there is another reason in our present state of economic development for a body which has a sound and healthy concern about inflation. That is the strong pull in the other direction, which gains power from a host of politicans and large groups of our population, and which does not lack economists and pseudo-economists to bring it intellectual support. The Employment Act of 1946 is now the main guide of public economic policy. The danger is that this call for government action to promote maximum—not full—employment, production, and purchasing power will be interpreted to mean that monetary policy should embrace creeping inflation, so as to create conditions which are said to be necessary to the promotion of 'full employment,' no matter what happens to the purchasing power of the dollar."

The Republican politicians hope that Mr. Sproul is right.

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# Belt Conveyor Maintenance

By R. U. JACKSON
Manager
Mine Conveyor Sales and Development
Hewitt-Robbins, Incorporated

another P-Q exclusive

BELT conveying is a method of transportation which requires proper servicing and maintenance if complete economical results are to be obtained from the system.

With a trucking system, it is common practice to deliver the trucks to a servicing station each day or, in some cases, at the end of each shift. Here they are inspected, checked, lubricated, and in many operations, are even washed. With this truck system, an operator rides the unit. He is in a position to note and report each fault as it develops.

With a railroad transportation system, there is the same procedure. With underground rail transportation there is also a similar procedure; one person operates the locomotive, which obtains periodic inspection and repair.

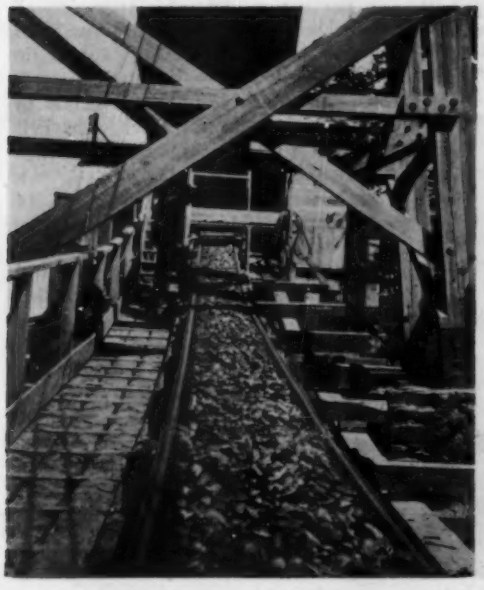
Sufficient credit is seldom given to this procedure, yet it is the key to the successful operation of all these systems—trucking, railroading, and rail haulage.

How about the belt conveyor transportation system? Here is a system that does not require an operator for each individual unit. It requires only a main switch and an adequate sequence interlocking system. A switch is closed, and the system starts operating. At the end of a shift the switch is opened, and the system stops operating. The system is so simple to operate that maintenance is considered as only a casual requirement; consequently nothing is done about it until after trouble has developed.

The very fact that the minimum amount of labor is required to operate a belt conveyor system has caused some operators to believe that no labor is required. The result is that inadequate supervision and maintenance is permitted, and poor housekeeping is the order of the day.

The beginning and ending of proper belt conveyor maintenance is *good housekeeping*. This does not mean cleaning up a conveyor line once every month or every two months; it means maintaining a clean conveyor system *at all times*.

At one operation where a substantial length of main-line haulage conveyor was installed recently, the management selected two men who were to be responsible for the maintenance of this system. He arranged with the belt manufacturer to have



Above: Periodic inspection and repair is the key to successful operation of a conveyor system.

Left: Good housekeeping is the beginning and end of proper belt conveyor maintenance. The line must be kept clean at all times.

Right: Lubricating idlers and drives, maintaining belt and conveyor frame alignment, detecting sticking idlers, and maintaining an unobstructed right-of-way is essential to proper maintenance.

these men visit the plant where the belts were made so that they might learn something about belt construction, splicing, repairing, and general belt maintenance. When the conveyor system was installed, these men were members of the installation force working with the manufacturer's erection supervisor. They helped with the belt splicing and belt training, after which they were thoroughly capable of taking over the responsibility of the conveyor operation. They were given proper tools and proper maintenance instructions. By placing this responsibility on them, management was assured that the system would be operated economically and efficiently.

These men not only have the proper knowledge and ability; they also have the proper incentive. They understand that they are important cogs in the organization machinery.

When a conveyor system is installed, the manufacturers of the equipment and belt furnish adequate operating and maintenance information, bulletins, drawings, and lists of component parts and accessories; but too often this information is filed in the purchasing or engineering offices and the maintenance men are left with nothing of real value, to help them with their work. One belt man, properly equipped, can patrol a belt line of 1½ to 2 miles. He will lubricate idlers and drives, maintain belt and conveyor frame alignment, detect sticking idlers, and maintain an unobstructed right-of-way.

Actually, maintenance begins with the selection of the equipment and belt which are properly designed for the service required. Over-design is just as foolish and expensive as under-design. Both will work, for a time, at least, but neither will be economical.

The selection of a proper conveyor belt is of utmost importance. A belt required to handle material mined by present continuous mining equipment can be designed on the basis of tension requirements, with quality and thickness of covers designed to produce a proper balance between carcass and cover, to obtain lowest cost per ton, which after all is the governing factor.

A belt required to handle primary quarry output with large lumps requires a belt design of much heavier carcass in order to produce proper body to withstand impacts. The covers must also be designed for protection against this impact, although impact accessories are incorporated in the machinery design.

Here again, the belt carcass and covers must be in balance to insure low cost per ton.

Where a fairly long or steeply inclined belt is installed, with design data indicating the need for a 75-hp. motor, an operator should not think he is playing safe by installing a 150-hp. drive and motor. This is a most dangerous thing to do, as this overload starting power will certainly not help the belt.

A high-tension belt should not be started with across-the-line control; instead, some form of controlled acceleration starting should be used for belt protection. Across-the-line starting is, of course, permissible for low-power conveyors, where the belt is of minimum ply construction but greatly understressed in operation.

Dual pulley drives or tandem pulley drives should be used only where they are required to reduce belt tension and thereby permit the use of a more economical belt carcass. Dual or tandem pulley drives should never be used wtihout being properly lagged — preferably with grooved rubber lagging. Under wet or frosty conditions, grooved lagging will definitely help eliminate belt slippage at the drive.

For better and safer operation of long horizontal or slightly inclined belts, a gravity-type of automatic takeup should be located directly back of the drive for quick action in maintaining proper slack side belt tension, thereby eliminating belt slippage at the drive pulley.

On inclined belts over 13 to 14 degrees, this location of takeup may not be necessary, as the return belt itself acts as the counterweight and usually produces sufficient slack side driving tension. On this type of slope, it is more economical and more practical to place the automatic takeup at the tail end, eliminating the additional pulleys and more frequent flexing of the belt over these pulleys.

Although present standard practice calls for a pulley face 2-in. wider than the belt, for mine conveyor service in particular, the pulley face should be at least 4 in. wider than

**Left: Maintenance begins with the proper selection of equipment. A pulley face, for instance, should be at least 2 in. wider than the belt. This is insurance against belt damage from a "wandering" belt.**

**Below: Return idler location is most important. If return idlers are easily accessible to the maintenance man, his job will be easier and safer.**

the belt. No mine conveyor installation can be made perfect, and this precaution doubly insures against belt damage from a wandering belt.

Troughing and return idlers require lubrication, but they should never be over-lubricated. Unless the conditions are very wet or very dusty, lubrication once in 6 months is sufficient. The safest and most economical method for determining the proper lubrication period is to have the belt man take an idler out of service at specified intervals. He should take it apart and examine both grease and bearings. In this manner he can readily determine the proper lubricating periods. This procedure is much better than guessing at a lubricating period; it will save both labor and grease.

Return idler location is very important. These idlers should be located a distance below the conveyor stringers, to be more easily inspected by the belt man and permit him to see how the return belt is training. A more accurate inspection of belt and idlers is possible because his job has been made easier and safer. He cannot be expected to make frequent inspections of a belt that is tucked up under the conveyor stringers.

As to return belt training, better training will result if return idlers are spaced at 12 ft. than at 8 ft. The added pressure between belt and idler will permit each idler to do a better steering job in maintaining belt alignment, and there will be fewer idlers to maintain.

Adequate side clearance between return belt and conveyor frame is just as important as wider conveyor pulleys. During installation all conveyors should be properly aligned by transit, and spads should be placed so that a check on the alignment can be made at frequent intervals by the belt man.

One of the frequent causes of poorly trained belts is in the belt splice. If mechanical belt splices are used, the only safe method is to establish an average belt centerline at least 15 ft. back from each belt end to be spliced, then cut the belt ends at true right angles from these centerlines and match the ends carefully. Never square from the belt edge to make a splice; this belt edge is seldom true.

The items mentioned to this point have included chiefly the physical properties of the conveyor equipment itself, all of which should be given serious consideration, as they definitely affect the economical and safe operation of the conveyor system. Also, these physical features of design are a contributing factor towards the elimination of the alway-present fire hazard.

Since fire hazard must be considered as an important factor in mine conveyor design, additional features should be considered necessary for the successful installation of a belt conveyor system. These involve the use of adequate electrical control equipment. Consider the following requirements for a system which is in successful operation on a four-mile main-line belt haulage:

1. Connect each drive to the line through stepped resistance.

2. Start all drives in sequence, with the outby drive starting first, using a timing relay in the circuit of each drive, for actuating the following drive.

3. Automatically stop all following belts if any belt should stop for any reason; this can be accomplished by the use of a centrifugal switch located near the tail end of each conveyor to open the circuit of the following drive when the belt slows down or stops.

4. Stop all inby drives if any belt receives an overload that threatens spillage at the transfer point. This can be accomplished by the use of a mercury-type lever switch, which opens the circuit of the following belts as soon as the level of the material increases at the transfer point. This, of course, should be a momentary contact type switch, and as soon as the level decreases to normal, the circuit is automatically closed.

5. Arrange the control of each conveyor for independent operation when repairs or adjustments are being made by the belt man, mechanic, or electrician.

6. Provide a continuous "stop" control along the entire length of the belt system (the pull-cord or similar type), so that the belt man can immediately stop a damaged belt or one where possible damage is indicated during his patrolling of the belt.

7. Provide a drive pulley slippage control that will open the circuit of the drive as soon as belt speed is reduced due to slippage at the drive pulley. This can be accomplished by the use of a centrifugal switch with a driven control pulley riding the belt surface or also by the use of a chain-driven centrifugal switch actuated from a bend or snub pulley. Another type is a differential control unit in which one wheel of the differential rides the conveyor belt and a second wheel rides the conveyor drive pulley lagging, an arrangement which will open the drive circuit when the belt speed drops 4 to 5 percent below the speed of the pulley face.

Concerning belt fires in mines, many reports have been prepared indicating the causes of conveyor belt fires. These include the following:

1. Drive pulley slippage, where the slack driving tension has been removed or the belt has been stalled from an outside source such as a roof fall. This condition would be eliminated by the use of the automatic counterweighted takeup to control driving tension and drive pulley slippage of the stalled belt.

2. Return idlers become stuck. This condition will not cause a belt fire from the overheating of the idler pulley itself. It is practically impossible to ignite a moving belt. However, if oil, grease and fine dust are permitted to build up around a return idler, it is possible to start a fire. Good housekeeping on the part of the belt man will definitely eliminate these hazards.

3. Belt running against conveyor frames. Here again, the moving belt will not cause a belt fire. Proper maintenance and inspection will eliminate this condition, as the misalignment of the belt or frame will damage the belt.

4. Belt fires from outside source, such as a short-circuited power line. There is no reason that these power lines should not be carried in a parallel entry, and (where necessary, to connect drives, controls, etc.) through a conduit.

As to the conveyor belt itself, many tests and studies are now being made to furnish belt covers and to impregnate belt carcasses, in order to make the belt completely fire-retardant. Properly compounded Neoprene belts may be one of the answers. For use on belts approaching the working face, where dust control may be limited, Neoprene belts can be recommended as an added precaution.

In England extensive tests have been made with Polyvinol Chloride (P.V.C.) compounds. However, other tests indicate that the Neoprene compound is equally fire retardant; it also has other superior qualities, such as proper troughing under high and low temperatures and longer life under abrasive conditions.

The key to the entire subject of belt maintenance and elimination of fire hazards is proper control equipment, a good belt man for continuous belt patrol, and good housekeeping.

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HARRY J. LARKIN SR., general manager and secretary of the Rock Island Sand and Gravel Company, Rock Island, Ill., died on April 29.

# German Lime Technicians Discuss Industry Problems

another P&Q exclusive

THE latest developments in the lime industry of Germany were discussed at a recent meeting of the Deutsche Kalk Industrie. The following are translated summaries of selected papers read at the meeting, which were originally published in *Zement, Kalk, Gips* (Vol. 7, No. 1, January, 1954, pp. 25-28).

**By B. M. PEARSON**

Technical problems of the lime industry, ranging from quarrying to the shipping of the finished product, were discussed by P. Flaschsenberg. Beginning with quarrying, the operator has to decide according to the local conditions what loading equipment should be installed and what type of material transporting system is the most economical. Deep-hole blasting methods are gaining increasing significance with compact formations and average face heights, since considerably more uniform fall of material is obtained, ready for the shovel. However, this method of blasting raises numerous new problems. It necessitates many improvements on the high-lift shovels, which have given satisfactory service up to now; and it leads possibly to the conclusion that the modern American-type loading equipment is preferable.

The tendency now in Germany is to eliminate rail transportation of the broken stone, since the mobile and maneuverable heavy dump wagons—particularly with shorter runs and no excessively high moving loads—increase output both at the transport section and with the associated processing and handling machinery. The design of the dump wagons and their most useful dimensions have not yet been finally settled, however.

An improvement of the washing process for the removal of clayey impurities from raw materials is absolutely necessary. An unloading of the clarification tanks would appear to be possible by thickening installations and hydroclones.

New problems are encountered with grinding, by virtue of the fact that requirements regarding the fineness of pulverized limestone are continually rising.

Concerning lime burning, endeavors are being made to burn lime in vertical shaft kilns which is at least equivalent to the best rotary kiln lime and which has particles (both coarse and fine) that are uniformly soft burned. Burning with gas firing in the vertical shaft kiln will assume special significance in the future, since ash-free and low-sulphur products can be obtained. Special attention must be devoted to the development of kilns which allow the production of satisfactory products from fine-grained material.

Concerning the production of dry slaked lime, special interest is being shown as to the effects of the burning and slaking on grain structure. Automatic sampling devices for taking average test samples from mixed grain products have given satisfactory results.

*Relation between Blasting Methods, Shovel Dimensions, Transport Equipment and Crusher Sizes in Limestone Quarries* was a study discussed by K. Stumpf. As a result of the piecemeal development of mechanization in most limestone quarries, not all operations and machines are co-ordinated with each other, and accordingly the most rational method of working is not obtained. The best operating results can be achieved only if the blasting method most suitable for the quarry conditions is utilized and if this method is then co-ordinated with the shovel, transporting equipment, and crusher dimensions.

Series blasting in lower faces gives a lower blast fall of material, a fact which necessitates the installation of turnable shovels. Stall-chamber blasting gives a coarse size blasting fall of material, necessitating the installation of shovels with a high digging reserve. The blast fall of material from deep drill-blast methods is always in a condition sufficiently reduced for the shovel; consequently, for this system, small shovels are quite adequate.

The size of the material-handling wagons will depend on the shovel size, which in turn, will depend upon the height of the quarry face, stone size, and the digging radius of the shovel. The size of the handling wagons should be chosen so that no loss of time results in loading. For smaller shovels, the ratio of the shovel size to the handling wagon content should amount to 1:1; for larger shovels this ratio can be reduced to 1:3.5. By means of a time study, it can be easily ascertained that it is futile to operate with large wagons and small shovels and *vice versa*.

The size of the stone fed to the primary crusher should not exceed two-thirds of the upper crusher opening, so that all material can pass through readily. Secondary blasting is important, since it lowers costs by reducing delays and hold-ups at the crusher.

The most suitable equipment dimensions must be determined by each operating unit according to the local conditions. A plant with a large output in which the investigations considered above have been carried out operates at the most efficient degree if the deep-drill blast method has been chosen, using a shovel with a dipper content of 3 cu. meters, material-handling wagons with carrying capacity of about 20 tons, and a crusher with a jaw opening of 1,200 mm. (about 47 in.).

*New Advances in the Preparation of Limestone* was a topic discussed by E. Mohrs. The mechanization of operations in the lime industry requires the development of preparation installations which have been developed for the particularly severe requirements imposed. Whereas in the field of size reduction, sufficient experience is available from the pertinent industries using these methods, completely new ways, in part, had to be devised in developing systems for washing the stone. The drum washers which were first installed were found to be unsatisfactory due to severe stone wear and the production of an

undesirably high proportion of splits and sand. Further, the units could not remove the insoluble alumina and fat clay in the water.

Center washers suitable for the preparation of washed material of this type work only with stone up to 60 to 80 mm. in size (about 2½ to 3 in.). The product of splits and sand is likewise small. A considerable disadvantage of the center washer lies in the fact that the filled drum cannot be driven on and accordingly the washer must be driven empty for about 15 to 20 minutes before the conclusion of the operation.

In order also to be able to wash stone up to 200 mm. in edge length (about 8 in.) as for example for use in high-output shaft kilns, special installations are necessary. Among these, the oscillating washer has proved to be the most satisfactory, as regards its weight and its power requirements per ton of washed material. As in the case of the drum washers which were constructed on the basis of cylindrical sieves, the oscillating washer was developed on the basis of experience with the shaking sieve machines. Because the intensive utilization of wash water, and the low maintenance charges, oscillatory washers would appear to be particularly suitable for small and average sized works.

Water requirements of the stone washer can be assumed at 0.5 to 1 cu. meter per ton of stone treated. Just as difficult as the determination of the required amount of water, is the clarification of the slime water. For the separation of the sand, which can thus be re-used, de-watering screws or sand traps can be installed. In order to free the de-sanded water from the fine sand and the materials in suspension before it is pumped into the clear water sump, thickeners are used, with dimensions corresponding to the sink-velocity of the solids in the slime water.

The recently-developed hydrocyclones serve the same purpose as the thickeners; they resemble in form the standard cyclones used for dust separation. While with a thickener the concentrate possesses a water content of 50 percent, it leaves the cyclone at about 30 percent. From this fact, it is possible to recognize the savings in construction and installation costs, although these units require a higher power consumption and are subject to continuous wear. It is possible by means of hydrocyclones to separate out grain sizes down to 0.03 mm. If particularly large amounts of water are to be processed, a combination of thickener and cyclones can be shown to be a most advantageous installation.

An address entitled *Dimensions and Burning Characteristics of Vertical Shaft Kilns* was presented by W. Anselm. Investigation of numerous shaft kilns which have been operated in the lime and cement industries have ascertained the chief factors which determine furnace output and heat consumption. The ratio of fuel grain size to the size of the material charged into the kiln should amount to 10.5 down to 1:01.

In investigations of various furnaces it has been shown that a proportional relation exists between gas velocity and furnace throughput, calculated on the cross-sectional area of the shaft. As burning temperature is given by gas velocity, the temperatures necessary for obtaining a desired lime quality can now be better maintained. Further, it is possible to determine the most suitable diameter of the shaft kiln for each operational purpose. Through a precise study of the retention time of the material in the kiln, the height of the shaft kilns can also be determined; from these determinations the ratio of height-diameter can be shown.

The numerous series of investigations by which the individual influencing factors were placed in relationship with one another led to model laws which can be employed as fundamentals in the establishment of shaft kiln dimensions. Thus burning relationships and heat consumption can be ascertained so that it is possible to determine the kiln output and to control the operation of the kiln with more certainty.

*Commercial Problems of Lime Size Reduction* were discussed in an address presented by G. F. Huettig. The behavior of a solid during the crushing process depends on its internal structure, *i.e.*, on the crystal lattice and the linkages which exist between the individual crystals. By means of scientific research which has been conducted on these phenomena, it has been shown that not only ideal lattices with uniform empty spaces are found but also damaged and defective places and occluded foreign bodies in the lattice; and in the environment of these disturbed places, the linkages are weakened. The linkage-spectrum is obtained by graphic plotting of the frequencies of the various linkage strengths. Various experimental methods are available today for the development of a linkage spectrum.

The oscillatory frequency of the lattice atoms can be ascertained from the Raman spectra and this is a function of linkage strength.

By means of X-ray small angle methods, information can be obtained regarding the sizes of internal specific surfaces and the linear dimensions on the particles obtained.

By the fractional loosening of linkages it is possible to induce merely a separation of weak linkages.

With mechanical test processes it is possible to establish divergences between theoretical and actual rupturing strength present.

In studies of the grinding process six variables were determined which affect the finished product. These are (1) throughput characteristic, (2) frequency, (3) mill flow, (4) reduction movement, (5) grinding characteristic, and (6) formation characteristic.

With continuous grinding, a point is reached at which the mill no longer reduces, but begins to weld together smaller grains to larger ones. A milling equilibrium is attained when the characteristic of a powder is no longer changed by further milling.

Various materials show a fundamentally differing behavior with milling. Three types are evident: (1) cleavage (splitting), by which every grain is disintegrated into smaller pieces; (2) rubbing, by which a thin coating is progressively and continuously removed from each grain; (3) powdering, by which, through mill action, a grain is progressively reduced to fine powder.

## Iceland's First Cement Plant To Be Built Near Reykjavik

According to *Mineral Trade Notes*, published by the United States Bureau of Mines, efforts are being continued to establish a cement industry to supply Iceland's requirements and to eliminate or reduce imports.

Last October preparatory work began for the island's first cement plant, to be located at Akranes, north of Reykjavik. A breakwater was built, and the foundation for the plant was begun. Because this is a fishing community, there have been emphatic protests from fishing interests, whose spokesmen state that the cement-making installation will endanger their industry.

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The text of the Edgar Marburg Lecture entitled *Interpretation of Engineering Data: Some Observations*, which was presented by Harold F. Dodge at the 1954 annual meeting of the American Society for Testing Materials, is now available in book form. Copies may be obtained from A.S.T.M. headquarters, 1916 Race Street, Philadelphia 3, Pa., at $1.50 each.

A general view of the abandoned quarry owned by Basic Refractories before the quarry was made into a recreation center.

## Basic Refractories and Community Co-operate in Reclamation Project

WASTE land reclamation is a problem receiving increasingly more attention in the pit-and-quarry field. In many cases producers have succeeded in changing worked-out land into really useful properties.

Basic Refractories, Inc., is one such concern which changed an unused quarry into an effective public and employee relations project. A nine-acre water-filled quarry, part of a 40-acre plot decommissioned by Basic in 1931 when they bought out the Kennedy Refractories interests at Bettsville, Ohio, was eyed longingly by many citizens on hot days.

Controlling swimming began to be quite a problem, but after several conferences in 1953, Basic's officials came up with a solution. The Bettsville quarry had been serving the company's plant and laboratory water needs but recent availability of city water had relieved it of that function. The company officials did not foresee any impending needs for dolomite from the quarry, either, so they offered to lease at a subnominal fee 40 acres of their tract for a recreational area, provided that Bettsville showed a desire and ability to meet safety and health codes.

The citizens were eager to accept the offer and soon had chosen an area comprising the nine-acre lake and 31 acres of wooded land which were most suitable for a park. Work was soon begun.

Basic Refractories supplied air compressors, blasting tools, bulldozers, concrete mixers, jack hammers, and the necessary dynamite and equipment, free of charge, to properly grade the wall of the quarry. Many of the townspeople are Basic employees and therefore experienced in working with the equipment. Of course, beach sand was needed; so the company gave "Operation Swimming Hole", more than 1,200 tons of white dolomite sand.

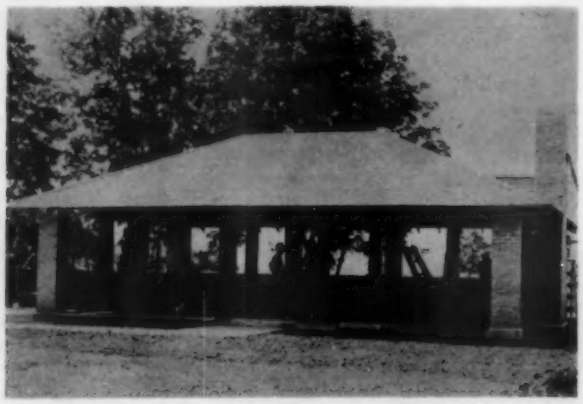
By July 29, three weeks after starting work, families were enjoying their own beach. Life guards were present for their protection. (Their salaries were paid by selling family season tickets at $1.00 each.)

In appreciation of the part played by Basic Refractories in creating the park, it has been named the Howard Eells Recreation Center after H. P. Eells Jr., president of Basic.

Determined to make the center as complete as possible, the company and town have joined to install dressing rooms, baseball and softball diamonds, a basketball court, picnic tables, fireplaces, swings, slides, and other facilities. Recently a large, attractive shelter house was constructed in the park. Fencing will be placed around the entire quarry, except at the beach, to protect picnickers. Parking facilities have been provided, a road from a nearby highway has been laid, and a ditch was bridged with 36-in. concrete tile. Aesthetic pleasures have not been slighted, either, for intensive landscape improvement has helped to change the quarry into a park area.

This project is another example of the uses to which retired quarries can be put. It is a case of an enlightened business firm changing a virtually worthless holding into an effective public relations project, and serving as a real aid to community improvement.

This pleasant bathing beach was made from the old quarry through the co-operation of citizens of Bettsville with Basic Refractories.



Refuge from sudden downpours and a gathering place is provided by this newly constructed shelter house.

# Callanan Speeds Production With New Quarry Drill

By FITZGERALD C. SMITH

AT ITS Kingston, N. Y., plant the Callanan Road Improvement Company has been able to increase its aggregate production with less manpower in meeting a New York State Thruway Contract by using a Travel Drill in its quarry operation. Before the drill was put into operation last April there were seven jackhammer men, a nipper, powder man, a wagon drill operator and a helper working at the face. In addition to this, a crawler crane with a 5,500-lb. drop ball was used to help with the secondary blasting.

After Callanan took delivery on the Travel Drill, two of the jackhammer men were eliminated from the operation, along with the crane. However, the production was increased by about 50 percent. Last year the quarry produced approximately 800,000 tons, which included screenings and also about 45,000 tons of asphalt, which was turned out by a Cedarapids hot mix plant. This was about 150,000 tons more than in 1953, using less labor and working shorter hours. Orville Van Alstyne, superintendent of the quarry, estimates that the Travel Drill takes the place of about five jackhammer men.

The use of the new type of drill has solved the only drawback in the smooth operation of the plant. The Kingston quarry face, which rises from 100 to 200 ft. in height, has a short working area, and the 120-B Bucyrus Erie at the face was piling up more stone for secondary drilling than the jackhammer men could drill. When this happened, it would slow down production considerably, as the 120-B would have to rehandle the cast-out stones sometimes two or three times to get them out of the pit. Now the Travel Drill is able to work right along with the electrically-powered 5½-cu. yd. shovel and keep the area behind it clear. This also leaves the jackhammer men free to drill the large stones higher up on the bank.

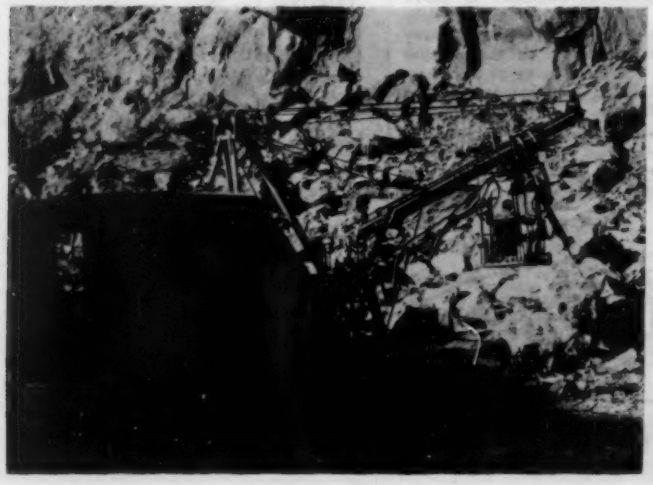
The Travel Drill works quickly because it is a self-contained unit. There is no problem of moving air lines and compressors in and out of the blasting area, a time-consuming operation. This machine can also drill from any angle, an operation that is difficult and sometimes impossible for the jackhammer man. It drills 2- to 4-ft. holes with the best results. The tendency is for a jackhammer man to drill too deep a hole or too many holes in a stone when it may be inconvenient to move his drill and hose from one stone to another.

There are quite a few rainy days in the spring and fall in the Kingston area. During the bad weather the shovel had hard digging as the stone piled up in the pit because the jackhammer men didn't work in the rain. This situation naturally led to a slowdown in production. However, the operator of the Travel Drill is protected from inclement weather and can work at any time. Until this drill was used, the crew had to work 12 hours a day to keep the mill running ten hours. Now both operations run on the same schedule.

The Travel Drill, manufactured by the Travel Drill Company, Raleigh, N. C., is powered by a D-318 Caterpillar diesel motor which drives a Gardner-Denver 215 c.f.m. air compressor. It is mounted on three wheels. The two front wheels drive and steer the drill, while a rear underslung swivel wheel supports the rig and aids in the steering. The operator is suspended from a 40-ft. boom in a 3-ft. sq. control basket. The basket protects him from the sun, and side curtains keep out the rain and wind. All the hydraulically-operated controls are located in the basket at the operator's fingertips. A hoist control on the boom can move the operator and hammer along 30 ft. on the boom, and it can be adjusted anywhere from a 10-degree to a 45-degree angle. This gives the operator a working radius of about 30 ft.

In the Kingston operation the Travel Drill uses a 1⅛-in. round drill steel with a 1⅝-in. detachable carbide bit. The drill, which is a Gardner-Denver 3-in. drifter, is able to handle from 6- to 14-ft. drill steels.

Although the plant is usually shut down from January to some time in March, there is work for the Travel Drill 12 months a year because it can be operated in bad weather. When this operation was visited on a blustery day in March, the drill was in use on some maintenance work. It was being used to blast rock to clear the way for a drainage line to take water from a sump which receives waste water from the mill. The operator sat snugly in the control basket protected from the sharp gusts of wind and the flurries of snow that whipped through the quarry. Aside from finding a good jackhammer man to work in the middle of winter, it is doubtful that one could have worked long in that weather.



This drill works with the shovel and helps keep the working area clear, even in a restricted space.

A closeup of the control basket shows how the operator is able to drill at any angle.

The Kingston plant covers an area of about 75 acres. It is located on Roundout Creek, a short distance from the Hudson River. Most of the aggregate can be shipped by barge up the river to Albany and down to the busy market in the New York metropolitan area.

The mill produces everything from crushed rip-rap which runs from 14- to 15-in., used mostly for pier work, to the regular commercial sizes of crushed stone, which run from minus 2½-in. to plus ⅛-in. Before the Thruway contract period the mill averaged about 200 t.p.h. During the Thruway contract period the mill averaged about 300 t.p.h. The Thruway used an aggregate of about 60 percent of ½-in. and ¾-in. and 40 percent of 1½-in. stone.

The mill has an Allis-Chalmers 42-in. gyratory primary crusher, two 16-ft. by 72-in. Allis-Chalmers revolving scrubbers, and two 16-in. Allis-Chalmers secondary crushers. Two Hewitt-Robins 5-ft. by 12-ft. Gyrex screens scalp the stone before it enters the two 6-ft. by 14-ft. double-deck Allis-Chalmers Ripl-Flo screens, six 5-ft. by 12-ft. Kennedy-Van Saun vibrating screens, and one 4- by 8-ft. Gyrex screen which produce 2½-in. down to ¼-in. stone. The oversize is reduced down to finer sizes by a 3030 Cedarapids hammermill, a 49½ Kennedy gyratory crusher, and a 4-ft. Symons Cone crusher. From the 200-hp. motor used on the primary crusher to the 10-hp. on the shaker screens, General Electric motors are used almost exclusively.

The stone is trucked to the mill in five Easton 10-cu. yd. capacity side-dump trailers pulled by International tractors. Two 22-B Bucyrus-Erie shovels and a Haiss bucket loader are used on the stockpiles.

Although the Kingston plant of Callanan has been in operation only since 1937, when it first turned out rip-rap, the company is one of the oldest in the East. It has been in continuous operation for 72 years, having been founded in 1883 by Peter Callanan, whose son J. Reid Callanan is now president. The headquarters are in South Bethlehem, New York, where a quarry and an agricultural limestone plant are maintained. Callanan also has a batch plant at Feura Bush, N. Y., and a slag crushing plant at Troy, N. Y.

Orville Van Alstyne is superintendent of the Kingston plant, and Lester Van Alstyne is assistant. Wilson Brooks is superintendent of the asphalt plant, and James A. Le Suer is sales manager.

## Expansion Projects Slated At 2 National Gypsum Plants

Officials of the National Gypsum Company have announced that the firm will spend about $350,000 to expand the facilities of two plants to handle increased demand.

Chairman Melvin H. Baker said that work had started on installation of new equipment costing about $250,000 for the company's Gibonsburg, Ohio, limestone processing plant. Another project involving an expenditure of approximately $100,000 will start soon when production facilities are expanded at National's Medicine Lodge, Kans., gypsum plant.

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According to the U. S. Department of the Interior, salt production in the United States reached an all-time high of 20,789,003 short tons in 1953, exceeding the previous record of 20,207,131 tons in 1951. Increases were noted in evaporated salt and salt from brine, whereas there was a slight decrease in output of rock salt.


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### Atlas Powder Company Awards Eight Scholarships

Eight top chemistry and engineering students have been awarded $1,000 Atlas Powder Company scholarships for their senior year in college, it was announced by Ralph K. Gottshall, president of the firm.

The eight were chosen from a group of 21 finalists who had spent two days in Wilmington being interviewed by Atlas officials and visiting the company's central research laboratory and chemicals plant there. Scholarship applications were submitted by over 120 applicants, representing top students in 33 colleges and universities throughout the country.

Factors in making the awards were scholastic standing, recommendations of college authorities, extra-curricular activities, and financial need.

In addition to the scholarships, the eight winners will be given a chance to gain practical experience this summer by employment in one of the Atlas explosives, chemicals, or activated carbons plants, or in the company's research laboratories.

According to Dr. Thomas Kennedy, chairman of the Atlas scholarship committee, the program was started last year to help worthy science and engineering students to complete their education.


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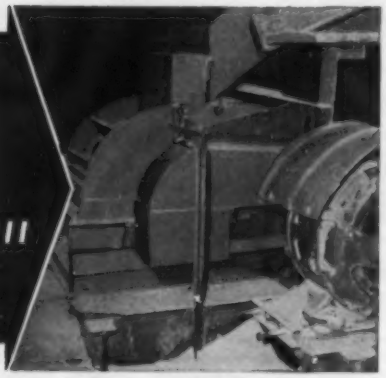

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### Manual of Drainage Products Issued in Revised Edition

A new edition of *Handbook of Drainage and Construction Products*, a book first published a quarter of a century ago, is a comprehensive technical treatment of the design and engineering application of a number of widely used drainage and construction products.

The purpose of the book is to aid engineers in solving drainage problems and related engineering construction problems, also to enlighten students in practical modern drainage and other construction problems.

In ten sections and 64 concisely written chapters it covers strength research, strength design, durability studies, durability design, economic factors, design principles and practice, subsurface drainage, special drainage problems, miscellaneous problems, and installation instructions.

A typical section—Design Principles and Practices—indicates the thoroughness of the work. The thirteen chapters of this section deal with the following: hydrology; design of open channels; theory of critical flow; design of culverts or cross drains for size and shape; culvert location and length; highway surface drainage; railway surface drainage; culverts under levees and dikes; end finish of culverts; design of sewers for size, etc.

Published by Armco Drainage & Metal Products, Inc., Middletown, Ohio. 592 pages. Price, $5 per copy postpaid.

### Huron, Lehigh Sign Contracts With Union Representatives

Management representatives of two major cement firms recently signed new wage agreements with labor unions. At Alpena, Mich., spokesmen of the Huron Portland Cement Company and the bargaining committee of the United Stone and Allied Products Workers of America (CIO) reached an agreement which was quickly ratified by the employees of the plant. This new contract calls for a general wage increase of 6 cents per hour, an improved pension plan, and other fringe benefits.

Lehigh Portland Cement Company management and representatives of the United Cement, Lime and Gypsum Workers of America (AFL) signed an agreement providing an average wage increase of 7 cents per hour.

# More Information, Please

**Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.**

**TRUCK BODIES** noted for design, durability, and dependable duty are featured in this brochure offered by the *Weston Dump Body Co.* In it are described their multiple duty bodies which incorporate many features which make operation simple and sure. (1)

**ENGINEERING DEVELOPMENTS** released by *Allis-Chalmers* during 1954 are explained in this interesting booklet. A special section on the mineral industries deals with the many improvements incorporated in the firm's machinery applicable in that field. (2)

**SETTLING SLIMES** quickly is the job of Aerofloc reagents made by the Mineral Dressing Department of *American Cyanamid Co.* Side-by-side illustrations graphically illustrate the effectiveness of this firm's products. (3)

**WIRES & CABLES** for dependable wiring are sold by the *Chester Cable Corp.* This pamphlet lists their many types of wires, cordage, cables, etc., designed for many applications. (4)

**BEARINGS** made with Ryertex, that rugged plastic composition material made by *Joseph T. Ryerson & Son, Inc.*, give long service, as do other parts utilizing Ryertex. Agitators, conveyors, screens, and many other machines when fitted with Ryertex bearings have been found to consume up to 25% less power. (5)

**COLD STARTING** of diesel and gasoline engines is greatly facilitated by the use of Spray starting fluid sold by the *Spray Starting Fluid Co.* It eliminates towing, heaters, and extra batteries. (6)

**HAMMER MILLS** for really heavy duty are manufactured by the *Williams Patent Crusher & Pulverizer Co.* They increase your output, improve product quality, and reduce your cost-per-ton by as much as 50% according to the maker. (7)

**THIS LOADER** made by the *Seaboard Equipment Co., Inc.*, and called the Merton Overloader, has a ¾-yd. bucket, heavy-duty dry plate clutch, and a winch-operated variable height discharge from 6 ft. 11 in. to 11 ft. 2 in. (8)

**STEEL CASTINGS** from the *Burnside Steel Foundry Co.* are uniform in their superiority and dependability. The firm's extensive equipment and the years of "know-how" that they have experienced enable them to achieve and maintain the quality that is desired in such parts. (9)

**WASHER-CLASSIFIER** catalog put out by *Eagle Iron Works* describes the entire line of such equipment manufactured by the concern. The new design of large double screw units with 44 in. dia. ribbon-type flight is detailed. (10)

**ELECTRIC ARC WELDING** seams of cylindrical and elliptical vessels or pipe is covered in this study by the *Pandjiris Weldment Co.* The cost analysis bulletin contains 18 cost factors affecting the cost of welding footage and how their equipment will help cut your bills. (11)

**PRODUCTION COSTS** and ways to lower them in cement plants is the subject of this leaflet put out by the *Carondelet Foundry Co.* The flexibility of their electric melting and moulding facilities mean custom-made, heat- and abrasion-resistant alloy castings that give longer, cost-cutting service. (12)

**TUBELESS TIRES** for off-the-road machinery are covered in this literature by *The B. F. Goodrich Co.* The firm reports that their tubeless tires have seen service in every section of the country and in foreign countries for 2 years, and have delivered remarkable service. (13)

**A BONDING CEMENT** made from a new synthetic resin is reported to give longer pot life and superior workability. Made by the *Ceilcote Co.*, Corobond cement is the ideal product for joining materials experiencing acids, solvents, etc. (14)

**FEEDERS & ROTARY VALVES** made by the *Fuller Co.*, are described and illustrated in this booklet. The company manufactures both roll and vane-type feeders and this literature gives excellent suggestions for their use. (15)

**VALVES** in the *Farval Corporation's* Dualine series are easy to order with this ingenious Visualizer chart. And when you order their valves you're assured of dependable action in either hand-operated or time-controlled, fully-automatic systems. (16)

**BULK STORAGE BINS** made by the *DAY Company*, are reviewed in this brochure. It covers their bins for locations with limited headroom, and horizontal storage bins which provide a sanitary and efficient means of handling bulk materials. (17)

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# More Information, Please

**Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.**

a crawler-mounted model have been introduced by the *Schield Bantam Co.* They feature more power from a 6- instead of 4-cylinder engine, new 2-shoe swing clutch, antifriction bearings, and a new plate lock. **(18)**

**A SPREADER** with power take-off, motor or hydraulic drive, is made by *Highway Equipment Co., Inc.* Their Hi-Way Model "E" spreader provides plenty of power, heavy-duty conveyor chain, and a system which allows remote control. **(19)**

**"BETTER DRIVES"** is the title of bimonthly publications devoted to the application of power transmission equipment to meet today's industrial needs offered by the *W. A. Jones Foundry & Machine Co.* **(20)**

**OXYGEN ANALYZING** is sure with this instrument made by *Arnold O. Beckman, Inc.* This convenient instrument comes in two, low-cost models—one for field and plant use featuring portability, and another for applications where it need not be moved as often. **(21)**

**FLAT-BELT DRIVE** catalog offered by the *American Pulley Co.* includes specifications for steel split pulleys, Hi-Torque motor pulley, shaft collars, hangers, and bearings, and American Econ-O-Matic motor bases. **(22)**

**HAMMER MILLS** manufactured by the *American Pulverizer Co.*, are known for their freedom from breakdowns. In this bulletin entitled "Better Stone Crushing" the firm explains how you can cash in on the extra-profit facts concerning their machinery. **(23)**

**CRUSHING & SCREENING** with the "77" All American plant made by the *Diamond Iron Works*, assures maximum productivity, easiest portability, and real dependability. This 64,000 lb. unit of 175-225 yd. per hr. capacity has a 20 ft. 11 in. wheelbase. **(24)**

**PERFORATED STEEL** for vibrating, revolving, or shaking equipment is made by the *Cross Engineering Co.* Available with round, square, or Cross Hexcreen openings, they serve every need. **(25)**

**A TRACTOR** available with a multiplicity of attachments is to be had in the 200 hp. Model "C" Tournatractor released by *LeTourneau-Westinghouse Co.* It achieves a speed of 19.2 mph and has a wheelbase of 5 ft. 11½ in. **(26)**

**BRAKE SERVICE GUIDE** in a new edition has been put out by the *Raybestos Div. of Raybestos-Manhattan, Inc.* This large manual contains check lists for primary causes of noise, pedal rising, low pedal, etc. **(27)**

**DEWATERING & DRYING** with *Denver Equip. Company* thickeners, filter and dryers are described in this informative leaflet. Pumps and belt classifiers are also described. **(28)**

**COUPLINGS** made by *Dynamatic Div. of the Eaton Mfg. Co.*, provide a wide speed range, low power losses, simple construction, and rapid response. They use no brushes, slip rings, or commutator. **(29)**

**CONTROL** equipment offered by *General Electric* is listed in this comprehensive catalog. It has a special section devoted to selection of motor control, and contains complete descriptions of many items. **(30)**

**A DIESEL ENGINE** of 125 hp., 4-cylinders, and valve-in-head design has been released by the *Caterpillar Tractor Co.* The new unit, a 5¾ in. bore and 8 in. stroke engine, replaces the discontinued D8800. The new model offers 25% more hp., and operates at 200 more rpm. **(31)**

**HOSE** check list offered by the *Thermoid Co.*, uses 11 points to highlight the common abuses of hoses and why their products stand up better when subjected to such conditions. **(32)**

**FUEL OIL PUMPING** and heating and straining sets are covered in this bulletin from the *Coen Company.* In it are shown a number of suggested arrangements for practical units of this type. Complete descriptions and specifications are given for their quality line. **(33)**

**VULCANIZERS AND AUTOCLAVES** for every industrial purpose are offered by the *Adamson United Co.* This leaflet gives complete particulars on their many models which offer features specifically suited for your job. **(34)**

**MOTOR BUYING** information is given in this catalog made available from the *General Electric Co.* Complete coverage of the firm's standard a.-c. fractional and integral hp. motors in most general use is given. Included are general- and definite-purpose fractional hp. motors. **(35)**

**ROLL CRUSHERS** with anti-friction or plain bearings and chain or star gear drive are being made by the *Diamond Iron Works*, a division of *Goodman Mfg. Co.* This catalog lists their models and shows how the durable materials and accurate control of assembling promise a long life for the equipment. **(36)**

**JUNE, 1955**

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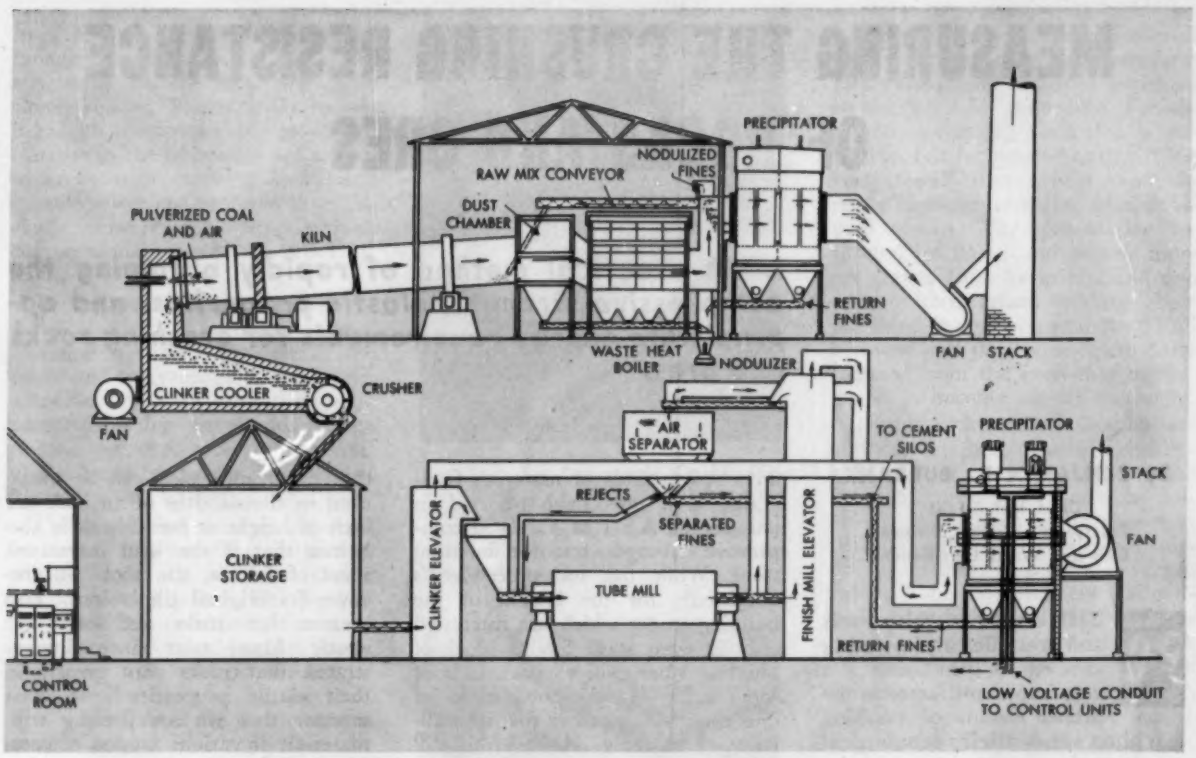


# How dust collecting problems are handled in the modern cement plant

The "why" of the Cottrell precipitator is well known to cement plant personnel—its use in nuisance abatement and cement dust salvage is well established. These diagrams explain the "how" of the Cottrell, including its familiar application to kiln gas and, more recently, its use in the ventilating system of the finishing mill.

### Kiln Gas

The upper half of the drawing shows a Cottrell for cleaning kiln gases. They are first passed through a dust chamber to the waste heat boiler and from there to the electrical precipitator, where the dust is removed. Salvaged dust is returned by conveyor to the process. The cleaned gas is discharged to the atmosphere through an induced draft fan and the stack. (Wet process kilns may also be fitted with Cottrells).

### And In The Finish Mill

Dust from the grinding mills has always been a major problem. The lower half of the diagram shows the recent application of the Cottrell for cleaning finish mill ventilating system gases. Cement dust is collected from the ventilating system serving the separators, conveyors and elevators. As before, recovered dust is returned to the process.

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For a more complete description of the Cottrell precipitator, write to Research-Cottrell for Bulletin GB.

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# MEASURING THE CRUSHING RESISTANCE OF ROCKS AND ORES

***A practical method of rapidly obtaining the compressive strength, elastic properties, and approximate energy requirements for crushing rocks and ores.***

**By BENJAMIN B. BURBANK**
Chief Metallurgist
Pennsylvania Crusher Division
Bath Iron Works Corporation

another P&Q exclusive

THE resistance which rocks and ores offer against being crushed for processing is a very important factor in the proper design of crushing machines and their economical operation. In a great many cases design or purchase of equipment for specific mine or quarry applications is based on comparison of the rock to be crushed with some other rock being successfully crushed somewhere else, which is often simply visual or hand-hammer testing. Truly an experienced engineer or quarryman can make some very good comparisons. There is, however, a demand for a more scientific approach.

A manufacturer of crushing machinery must keep several objectives in view when designing and supplying equipment to specific mines and quarries. Two important objectives are (1) that the equipment must be sufficiently strong to crush the rock easily, and (2) that it must deliver the required tonnage per day. Improper design for either may prove embarrassing for the manufacturer and costly for the operator. Realizing this, some of the leading manufacturers of crushing equipment have set up laboratories for testing rock and ores. These laboratories in many respects might be termed pilot plants in which fairly large quantities of rock or ore are processed through conventional equipment which is carefully instrumented and observed.

This form of testing is quite expensive for maintenance and for transportation costs of the relatively large volumes of rock and ore. A few companies have also tried to tie in strictly laboratory tests made on a few pounds of material. Generally, such tests have resorted in part to the A.S.T.M.-C170-50 compressive strength test for building stone. While this test procedure is admittedly for the benefit of the building trades which are interested only in what static load a block of building stone will support, it is of some value for the comparison of one rock with another for the difficulty of crushing. However, it still lacks much to be desired by the manufacturer of crushing machinery.

The laboratory of the Pennsylvania Crusher Division some years ago instituted a research program to develop a more useful and applicable testing method. Now as a result of testing many samples of varied rocks and ores from widely scattered places on the North American Continent, it is felt that a more valuable method of measuring the crushing resistance of rocks and ores has been developed. The procedure of this testing method is the subject of this article.

Before going further, however, it may be well to state that the A.S.T.M. method and this method give results that should be applied only to low-velocity crushing action (under 40 f.p.m.), which includes jaw crushers, gyratories, and some roll crushers. For faster crushing action, such as occurs in hammermills and impactors, there is evidence that the fracturing of rocks occurs quite differently and that these test results are not entirely applicable. Some work has been done on this high-velocity crushing but it is still incomplete and will not be further mentioned in this article.

As a background and a preface to a description of this testing method, it is a fact that all rocks and ores are compressible, that their dimensions will change measurably under compression prior to any failure (some rocks more than others), and that this compression can be measured in thousandths of an inch per inch of height or breadth. It is also a fact that if the load is relaxed short of failure, the rock will recover its original dimensions. This means that rocks and ores are elastic. Many tests have demonstrated that rocks vary greatly in their elastic properties in such a manner that we are dealing with materials of various moduli of compression.

Now consider also for a moment a basic law of physics. If a force of 550 lb. moves 1 f.p.s., it represents one horsepower. Force times distance equals power. In crushing rock it takes force; the rock is elastic; it moves a distance being compressed, and the result is power consumed. Under the A.S.T.M. method of compressional loading we consider force only and therefore have no indication of the elasticity and the power required to reach the limits of the compressional strength of the rock under test.

It has been demonstrated that two rocks may have the same compressional strength by A.S.T.M. methods yet vary greatly in their elastic properties. One may compress dimensionally three times as much as the other before failure. Such a rock would be three times as hard to crush. One familiar with the breaking of rock in a crusher knows that a block of rock is very rarely caught in compression anything like the way compressional tests are made in the laboratory on parallel-sided prisms. The rock is reduced by a series of nibbling, flaking, and spalling actions so that eventually it is trimmed to a block for the final crush which may be somewhat similar to the laboratory compression. All the crushing actions, however, represent fracturing; and since fracturing is influenced by the elasticity and compressional strength of a material, there

is in reality a tie-in, so that even though at first glance the two methods seem unlike, they are quite closely related. Elastic rocks requiring high compressional loads for fracture in the laboratory are known to crush with more difficulty and greater power consumption than less elastic ones requiring equally high compressional loads by the A.S.T.M. method.

In the method of this article the A.S.T.M.-C170-50 method has been modified regarding the size of the prism and the number of tests; then a method of measuring the elastic compression has been added. The routine testing of rock and ore samples as practiced under the modified method is as follows:

The sample received is inspected for sound, fracture-free pieces that will go under the diamond slicing saw for cutting prisms. Usually two pieces are taken so that prisms may be cut, some with bedding horizontal and some with vertical bedding if such can be detected in the rock. The chosen pieces are then mounted on squares of ¼-in. plywood by using plaster of paris, as shown in Fig. 1. While the plaster of paris dries rapidly, it is the usual practice to set up the specimens toward the end of the day, so that by the next morning they are surely set firmly on the boards.

The mounted specimens are then placed upon the table of a "Di-Met" slicing saw which has a diamond-charged bronze blade. See Fig. 2, which shows the splash guards removed. The table of the saw has needle-pointed pins protruding through its surface on which the plywood is pressed to prevent skidding during cutting; no other fastening is needed.

Slabs 2 in. thick are first cut as shown in Fig. 2. The saw is cooled by recirculating kerosene or diesel oil and cuts very rapidly the hardest of rocks, giving a very smooth face. Since the table has cross-feed screws, the specimen can be advanced and a series of parallel cuts can be made. Maximum cuts involving 10 to 20 sq. in. require only minutes.

When the 2-in. slabs have been cut, they are mounted on another piece of plywood face down, imbedded in plaster as before; these are resawed into prisms 2 by 1¼ by 1¼ in. simply by setting over and rotating the table 90 degrees. Fig. 3 shows this quite clearly. The prism faces are smooth and parallel enough so that for all practical purposes no further grinding or polishing is required.

Fig. 1—In the Pennsylvania Crusher Division's laboratory a sound, fracture-free piece of rock which is to be used for a sample is mounted on a ¼-in. square of plywood in plaster of paris on the day before the slicing is to be done.

Fig. 2—The mounted sample undergoing slicing into 2-in. slabs by the diamond-charged bronze blade of the slicing saw, shown with the splash guards removed.

Fig. 3—A 2-in. slab is mounted and sawed into prisms 2 by 1¼ by 1¼ in. in size. These prisms have faces smooth enough to require no further grinding or polishing.

During early experimentation great care was taken to grind prism faces to a glass-smooth finish as indicated in the A.S.T.M. procedure. For absolutely accurate work this is advisable, but for routine testing it has been found that prisms used directly from the saw give good practical results. The prisms are inspected for flaws, and two or more are chosen from horizontal and two or more from vertical bedding. These are dried in an oven to drive off all kerosene and then bone-dried. After removal from the oven they are allowed to become air-dry overnight.

Testing rock and ore samples wet and dry has been studied considerably, and for very accurate work the A.S.T.M. procedure should be followed. It has been found, however, that for all practical purposes, air-dry specimens give good average values. Bone-dry specimens will generally give higher values than saturated wet ones. Air-dry tests seem to hit the average of wet and dry tests quite well.

The size of prism used for testing is a deviation from the A.S.T.M. method. It has been found by experience that some rocks have such high compressional strength that the 2- by 2- by 2-in. prism of A.S.T.M. requires an extra large compression machine to break them. Even with the 2- by 1¼- by 1¼-in. prisms it is not uncommon to have total loads of 40,000 to 60,000 lb. at break. As 60,000- and 120,000-lb. machines are most common, it has been considered desirable to establish prism sizes that will come within range of such machines. Typical prisms are illustrated in Fig. 4.

The compressional loading is done as shown in Fig. 5, in this case on a Baldwin 120,000-lb. universal testing machine using an upper pressure pad with spherical surface for self alignment. A dial micrometer is adjusted against the upper beam near the specimen, and it is set at zero after a preload of 1,000 lb. has been placed upon the rock prism. The loading is continued, and readings are recorded. Actual load and thousandths of an inch compression are both recorded at the same time.

There is usually some warning before compressional failure. Cracking occurs, and at this time the dial indicator should be removed because at complete failure the sudden shock may jar the hand loose on the instrument. It is usually possible to obtain a series of ten or more readings, recording both load and thousandths of an inch compression prior to failure. All readings are computed to

compressional strength in terms of p.s.i. by the following formula:

$$C = \frac{\text{p.s.i.}}{0.778 + 0.222\ (b \div h)}$$

C = Compressive strength
b = average lateral dimension
h = height of prism
p.s.i. = pounds per square inch

For example, assume a 1¼- by 1¼- by 2-in. prism broke at 28,000 lb. total load.

1.25 in. by 1.25 in. = 1.5625 sq. in.

$$\text{Then } \frac{28{,}000}{1.5625} = 17{,}930 \text{ p.s.i.}$$

$$C = \frac{17{,}930}{0.778 + 0.222\ (1.25 \div 2.00)}$$

$$C = \frac{17{,}930}{0.778 + 0.222\ (0.625)}$$

$$C = \frac{17{,}930}{0.778 + 0.1385}$$

$$C = \frac{17{,}930}{0.9165}$$

$$C = 19{,}500 \text{ lb.}$$

The results for rock or ore specimens will vary between samples of different bedding and between wet and dry conditions. There will also be some variations between two specimens cut the same way in relation to bedding and tested under the same conditions. For really accurate work the number of samples suggested by A.S.T.M. (or even more) are to be recommended. However, for all general purposes the average of two samples not widely variant should be quite typical of the rock or ore.

As before stated, readings are taken from the dial indicator at 2,000 lb. intervals beginning at an initial load of 1,000 lb. For example, assume the sample prism for the compressive strength calculation given above gave the following values:

| Load | Indicator |
|---|---|
| 1,000 lb. | 0 in. |
| 3,000 " | 0.001 " |
| 5,000 " | 0.002 " |
| 7,000 " | 0.003 " |
| 9,000 " | 0.004 " |
| 11,000 " | 0.005 " |
| 13,000 " | 0.006 " |
| 15,000 " | 0.007 " |
| 17,000 " | 0.008 " |
| 19,000 " | 0.009 " |
| 21,000 " | 0.010 " |
| 23,000 " | 0.011 " |
| 25,000 " | 0.012 " |
| 27,000 " | cracked |
| 28,000 " | failure |

The actual readings above must be converted to compressive load values by formula, and the indicator readings must be halved because of the 2-in. prism height, then tabulated. Compressive strength opposite thousandths of an inch per inch compression which will be as follows:

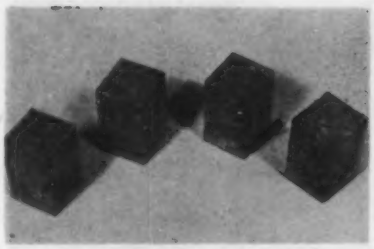

Fig. 4—Typical prisms sawed from a slab. They are dried in an oven, bone-dried, and then air-dried overnight.

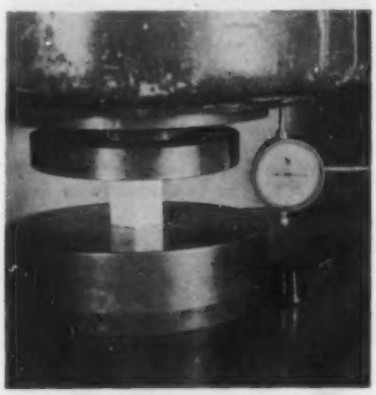

Fig. 5—One of the prisms in the testing machine at the Pennsylvania Crusher Division's laboratory. The dial micrometer is set at zero after a preload of 1,000 lb. has been placed on the prism.

| P.s.i. Compressive Strength | Deflection (inches) |
|---|---|
| 700 | 0.0 |
| 2,160 | 0.0005 |
| 3,490 | 0.0010 |
| 4,890 | 0.0015 |
| 6,300 | 0.0020 |
| 7,690 | 0.0025 |
| 9,060 | 0.0030 |
| 10,460 | 0.0035 |
| 11,850 | 0.0040 |
| 13,250 | 0.0045 |
| 14,700 | 0.0050 |
| 16,000 | 0.0055 |
| 17,450 | 0.0060 |
| 19,500 | failure |

Plotting these values on graph paper gives a resilience curve for the rock; and from it the total energy per cubic inch required to crush the rock may be computed. Such a graph is Fig. 6. For all practical purposes, the plotted line is set over so that it passes through zero for zero load because the readings were not taken before a 1,000-lb. preload was applied. This preliminary loading is necessary to compensate for irregularities of surface and to allow proper seating of the pressure pads on the machine.

It has been determined by the use of very sensitive gauges of the bonded resistance wire type that a preloading of 1,000 lb. is required before reaching the straight line portion of the graph. There are also irregularities just prior to failure, as shown by these gauges. Since we are not concerned with academic accuracy it is reasonable to use a straight line graph from zero to failure. When plotting to the breaking point, a horizontal line is drawn representing the corrected p.s.i. at point of failure, and then the graph line which has been set over to zero is connected as in Fig. 6. Now by dropping a line down from the intersection just determined the total displacement under compression at time of failure is obtained, which in this case is 0.00685 in. Such a graph quite clearly shows the elastic properties of a rock or ore. Furthermore, one can compute power requirements per cubic inch because it shows a force acting over a definite distance which represents power. To compute the foot-pounds of energy required to crush, the following formula is applied:

$$P = \frac{Fd}{24}$$

Where P = Power in foot-pounds
F = Applied force in p.s.i.
d = Compressional displacement

Applying this to the example of graph Fig. 6,

$$P = \frac{19{,}500 \times 0.00685 \text{ in.}}{24}$$

$$P = 5.75 \text{ ft. lb.}$$

Fig. 7 shows two rocks of same compressive strength but having very different elastic properties. Computing these,

$$\text{Limestone } P = \frac{9{,}000 \times 0.00375 \text{ in.}}{24}$$

$$P = 1.4 \text{ ft. lb. per cu. in.}$$

$$\text{Sandstone } P = \frac{9{,}000 \times 0.010 \text{ in.}}{24}$$

$$P = 3.75 \text{ ft. lb. per cu. in.}$$

Figure 8 is a graph showing the relation of several rocks and ores from widely separated localities. Each rock or ore has a different modulus of compression, as shown by the slope of the lines on the graph.

Fig. 9 shows (for the same rocks used in graph Fig. 8) the total compressive strength in thousand lb. per cu. in. as shaded bars and the total foot-pounds of energy per cu.

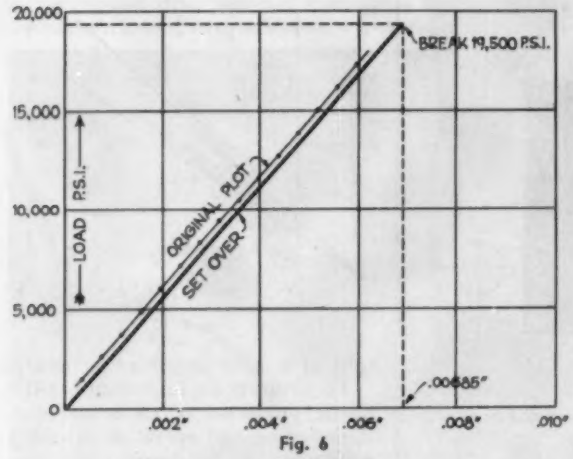

Fig. 6

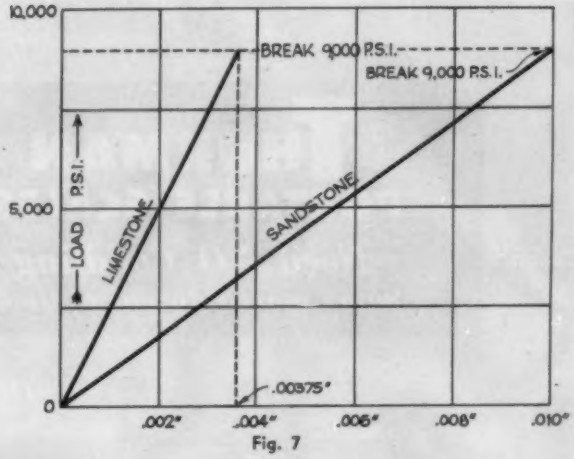

Fig. 7

in. to crush as solid bars. Thus, it may be seen that the energy to crush does not have a direct relation to the compressional strength of a rock.

In the case of rocks showing distinct stratification or bedding it is generally true that horizontal bedding when loaded perpendicular to the bedding gives the highest compressional strength. Figure 10 is a graph for a typical bedded cement rock showing the difference in physical properties between horizontal and vertical bedding. In some cases the difference may be even greater.

The testing procedure may be condensed and summarized as follows:

Cut at least two 1¼- by 1¼- by 2-in. prisms from each direction of bedding in the rock or ore, bone-dry all prisms, and allow to become air-dry afterward by standing overnight in the laboratory. Perform the compression loading test using a dial indicator to measure the compression in thousandths of an inch after establishing a preload of 1,000-lb. Read the load and dial indicator at 2,000-lb. intervals until first sign of cracking occurs. Then remove the indicator and proceed to load to complete failure, recording the maximum total load. From the readings obtained and corrected by formula, compute the compressional strength and foot-pounds of energy per cu. in. required to crush. Record the total compressive strength and foot-pounds of energy for each prism. Use average values of the prisms for report if the variation between individual prisms does not exceed 5 percent. If specimens cut show wild variations, due to unseen flaws, repeat until a fair average has been established.

The foregoing test method has been found to give valuable information, reasonably accurate without undue cost and time delay. For more accurate work, careful sampling and adherence to the A.S.T.M. method —using in addition a dial indicator for obtaining the data for plotting the resilience curve—will give re-

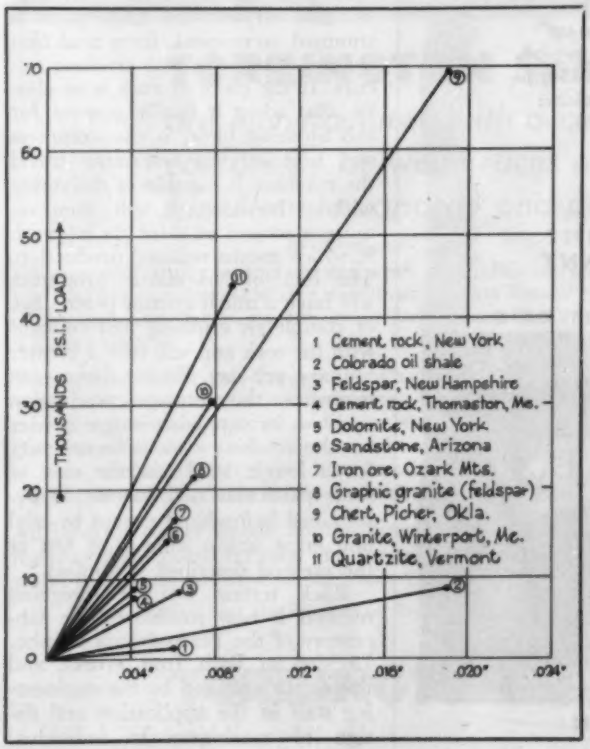

Fig. 8

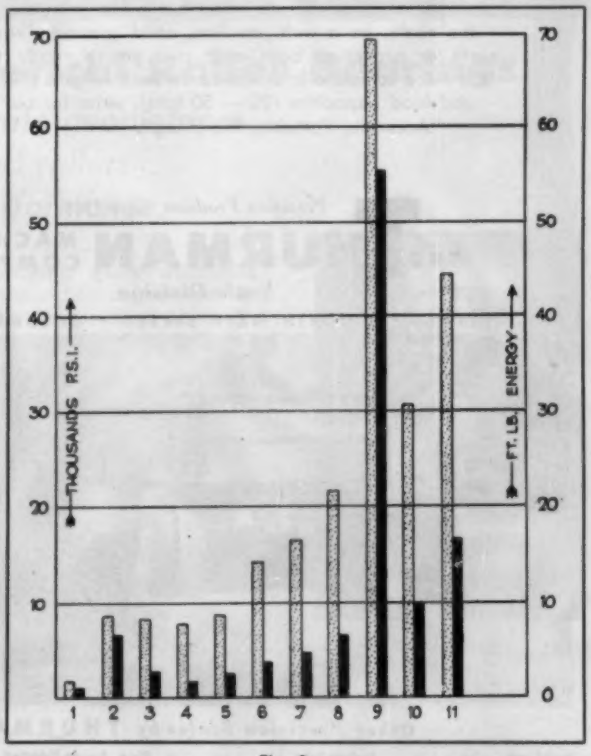

Fig. 9

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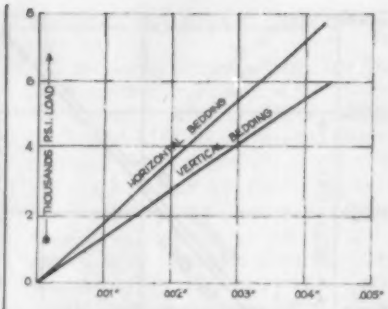


**Figure 10**

sults of a high degree of accuracy.

To illustrate the importance of the elastic properties of rocks and ores in designing and operating crushing equipment, let us consider the case of two plants. These operations, although widely separated, have rock of the same compressional strength but of different elastic properties. One rock shows twice the dimensional compression of the other by the foregoing test method. Each plant has the same type of crusher. The plant operating on the more elastic type of rock will experience a higher power consumption per ton of rock; but if the crushers are not properly designed, the one operating on the more elastic rock will experience *lower* tonnage per day. This is because many pieces of the elastic rock will require more than one impact to reduce them substantially.

In crushing, the corners are first knocked off and the large piece is trimmed, so to speak, for a final firm contact when the real crushing occurs. If the piece of rock is so elastic that when it finally gets set for this finishing blow, it can compress and take all the remaining travel the machine is capable of delivering without breaking, it will then require a second or third try to crush it, which means reduced production. The rock of less elastic properties will have a much greater percentage of completely crushing first contacts with the rock and will pass a greater tonnage per day. Proper design can overcome the tonnage production problem by supplying longer strokes for the crushing cycle. The necessity for a longer stroke in the case of some particular rock cannot be determined beforehand except by trial and error unless some such test as the method described is applied.

Rock testing by the foregoing method is now routine in the laboratory of the Pennsylvania Crusher Division at Bath Iron Works, and the results are used by the engineering staff in the application and design of machinery to individual crushing problems.

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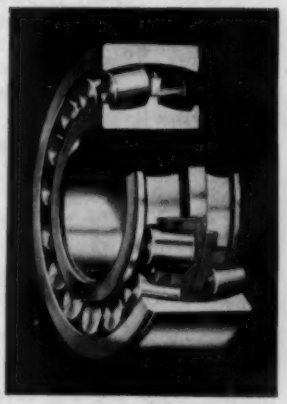

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# Human Response To Blast-Produced Vibrations

By JULES E. JENKINS*

President, Vibration Measurement Engineers, Chicago

ONE of the basic tenets of advertising is that the power of suggestion is all powerful. Advertising is to make known and communicate ideas—the more often repeated the more believed and longer remembered. This tenet is not new; it dates back to antiquity. "Carthage, methinks, must utterly be destroyed." That quotation was made by the Roman Marcus Cato (234-149 B.C.) over 2,000 years ago. Cato proclaimed this idea until he achieved his goal—the utter destruction of Carthage.

Fish is still regarded as a brain food when all dietitians know that it has no such exclusive virtue. Spinach is still stuffed into millions of protesting kids in spite of the fact there are many other much more palatable vegetables which are just as nourishing. Millions of people still will not eat oysters in a month that does not contain the letter "R" in its spelling despite the findings of frozen food research. The lasting qualities of catch phrase slogans firmly implanted in the public mind has long been recognized.

What has all this to do with human response to blast produced vibrations? Just this—like the false ideas we have related, like the old wives' tales that have been handed down through generations, persons subjected to the vibrational effects of blasting have developed a formidable category of false beliefs which have become firmly implanted and widely accepted by persistent and repeated telling. Here are a few:

"The doors and windows rattled and you can't tell me this won't damage the house."

"We are on a rock vein, and every time they blast we get the brunt of it."

"It was just like an earthquake."

"This house was built by a contractor for his own use, and he only put the best of materials and workmanship into it."

These are but a few of the misconceptions which are held by the public. They are the carryover of years which will continue despite denials by individual users of commercial explosives. It is going to take a lot of persistent and widespread education on association levels to change the public mind. Of this we can be certain.

The time has arrived when the crushed stone industry must give earnest consideration to embarking upon a comprehensive program of public relations. Legislative trends presently sweeping the country are strongly influenced by lay thinking. Many of the proposed regulations are predicated upon the misconceptions we have outlined. Once they are adopted, many operators may suddenly find themselves confronted with restrictions that would materially curtail their blasting operations to the point of hardship, yes, even to the point of complete shutdown. The industry might well adopt the slogan "Let us discipline ourselves before we are disciplined by others."

The products and by-products of the crushed stone industry constitute vital contributions to the comforts and benefits which make up the American way. Why not start by firmly implanting these benefits in the public mind?

By and large, persons inexperienced in the use of commercial explosives are possessed with the fixed opinion that explosives in any form are agents of destruction. These opinions are understandable since the public—especially during the last decade—has been subjected to an endless flow of propaganda (employing the repetition technique) calculated to impress upon them the tremendous destructive potentials of "A" and "H" bombs and other military explosives. It is only natural that people conclude from this constant indoctrination, that commercial dynamites present the same destructive potentials. The fact they do not take into consideration is that the military explosives are especially designed to create widespread havoc and destruction, whereas, commercial dynamites are engineered to perform work.

They do not know that several hundred grades of commercial explosives have been developed for specific applications. They do not know that several hundred million pounds of these "working explosives" are annually consumed in tasks vital to our daily existence.

They are not aware that the sand which produced the glass through which the morning sun shone to awaken them, was torn from the breast of Mother Earth by dynamite. They are acutely aware of the need for vitamins in their daily diets—another product of repetitious advertising—yet few persons, indeed, are aware of the fact that the vitamins they consume in their morning cereals were fused into these foods by the use of agricultural limestone, which came into being through the forces of dynamite.

They seldom think that the ores which provide the metals used to fabricate the vehicles in which they ride to their appointed daily tasks, and the concrete highways over which they travel owe their existence to dynamite. So on, throughout each day, the public pays scant heed to the countless comforts they enjoy, all made possible by this modern Hercules—and I might add—Atlas, DuPont, American Cyanamid, Trojan, King and a host of other explosive manufacturers!

On the other hand, the public is not possessed of similar ideas about gasoline or illuminating gas, yet these commodities are from 8 to 80 times more powerful than equal quantities of commercial dynamites. People know from personal experience that these domesticated explosives have been harnessed to motor-propelled vehicles and piped in safety to the family gas range; hence, they take them for granted. They do not know that when properly used, the behavior of commercial dynamites can be controlled in much the same manner and with equal safety.

All of this leads to the interesting conjecture—why do persons, and particularly persons of good repute, resort to the exaggerated and fantastic descriptions they employ? It is becoming increasingly manifest that the answer to this question will not be forthcoming until more is known about human response to impact forces.

Up to the present, seismology, as

*A paper presented before the National Crushed Stone Association Cincinnati, Ohio, February 9, 1965.

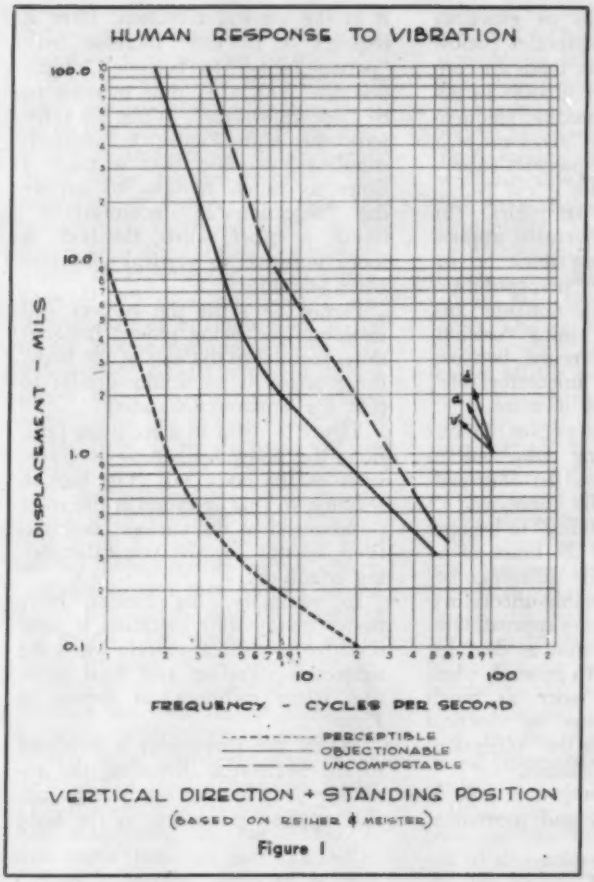



Figure 1

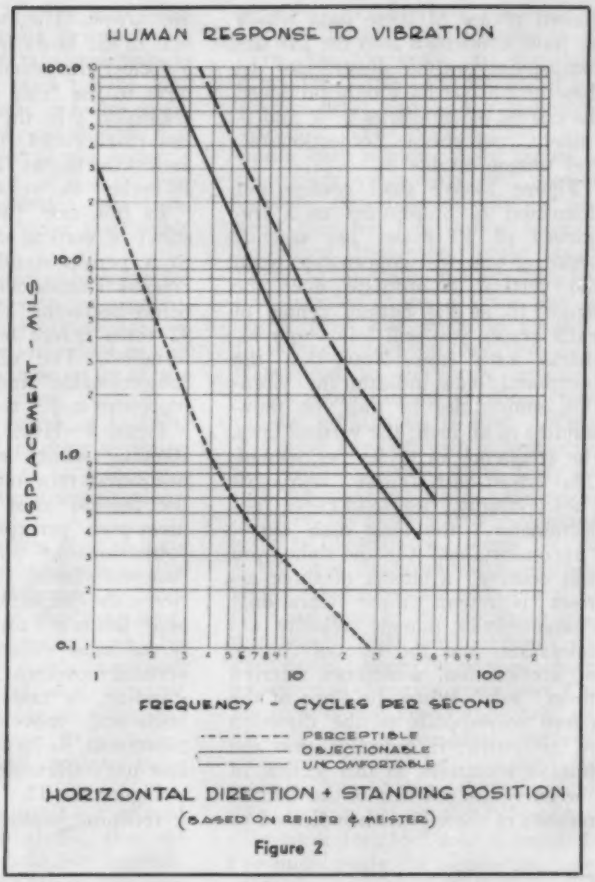



Figure 2

adapted to commercial blasting operations, has been almost entirely confined to interpreting blast-produced vibrations in terms of damage to structures. In the course of these investigations, scientists, physicists, and engineers have been constantly alert to the wide discrepancies between reported vibration intensities based upon human reactions and the actual intensity of the same phenomena as determined by instrumental measurement. The problem is not confined to blasting vibrations alone but extends from all types of low-frequency oscillatory motion up through the field of supersonics.

It was early recognized that the problem of human response to vibration is one that extends into the fields of physiology and psychology; however, vibration investigators to date have shied away from straying into other fields which they consider outside their professional scope. Nevertheless, we are at the point where some one must lead the way, even at the risk of being accused of trespass into such other fields.

When we review the work that has been done in human reaction to vibration, we find that the investigations are largely confined to steady state motions, and that they have been primarily concerned with product effects—the riding qualities in vehicles, vibration in ship structures and aircraft, just to name a few. At first reading, the published reports are seemingly contradictory and confusing. Upon further study, however, each premise is found to have merit within the limits investigated.

Unfortunately, aside from the fact that they provide valuable knowledge concerning human reaction to constant agitation, the data are silent with respect to transient or impact forces such as occur as the result of an embedded dynamite blast. They do, however, disclose interesting trends which undoubtedly will play important roles in the impact investigations of the future.

The work of the Germans, Reiher and Meister, undertaken at the Institute of Technology, Stuttgart, in 1931 and 1935, provide some important clues in this direction. These men subjected a group of 15 persons, 25 to 40 years of age, to the continuous oscillations of a vibratory platform, through amplitudes ranging from 4 ten-thousandths of an inch to 4 in., at frequencies of from 1 to 70 cycles per second. This amplitude-frequency range corresponds in general to that of the great majority of routine blasts both in quarries and underground mines. They exposed each subject to various vibrational modes for 8-minute test intervals, and extended the tests to include both vertical and horizontal motion, during which the subject was standing or reclining. In the reclining positions, motion was applied parallel and transverse to the axis of the body. Following each test the sensations experienced were rated as (1) not noticeable, (2) barely noticeable, (3) well noticeable, (4) strongly noticeable, (5) objectionable, (6) uncomfortable. Thus, between categories (1) and (3) the threshold of irritation was established, and between categories (4) and (6) the threshold of discomfort.

As was expected, the degree of sensation varied widely between subjects. Furthermore, the same sensation was not always experienced by the same person reacting to identical vibratory motion. Even so, the test results were carefully plotted, and a wealth of valuable data obtained. Time does not permit more than a

limited review of these data which we have condensed into the five accompanying graphic illustrations. In these graphs we have only produced the curves of categories 2, 4, and 6, namely, perceptible, objectionable, and uncomfortable.

Figure 1—We shall confine our discussion of amplitudes to a frequency of 10 cycles per second; hence, if you will concentrate upon the vertical co-ordinate over the figure 10 at the bottom center of each graph, you will follow our remarks with ease. Note that the horizontal lines indicate the vibration amplitudes in mils, or thousandths of an inch; the vertical lines, the frequency in cycles per second. The short-dash curve represents "perceptibility," the solid curve "objectionable," the long dash curve, "uncomfortable." On the right (you will observe) a cluster of three arrows represents three vibrational characteristics, namely, velocity, acceleration, and the rate of change of acceleration, sometimes referred to as "jerk". When the slope of the curve corresponds to the direction of an arrow, it indicates that the human sensations in this section of the curve are reacting to the characteristics of the vibration indicated by the arrow. This tells us generally that in the lower frequnecies (below 5 cycles) the reaction tends to conform to the "rate of change in acceleration"; in the middle frequencies (5-10 cycles) to "acceleration"; and in the higher frequencies (above 10 cycles) to "velocity".

In this case (at 10 cycles) the effect of vertical movement applied to a person standing must be increased 9 times over "perceptibility" before becoming "objectionable" and 32 times before becoming "uncomfortable". The difference between "objectionable" and "uncomfortable" represents a 3.5 time increase.

Figure 2—Here the person remains standing while being subjected to horizontal movement. In this case the motion must be increased 13 times over "perceptibility" to become "objectionable" and 39 times to be "uncomfortable". The difference between the "objectionable-uncomfortable" limits is 3 times—approximately the same differential as that for vertical movement. In general, when standing, it takes twice as much horizontal movement as vertical movement, to invade the "objectionable-uncomfortable" limits.

Figure 3—The subject is now in a reclining position and movement is in the vertical direction. Here it requires a 13 time increase over "perceptibility" to become "objectionable" and a 51 time increase to be "uncomfortable". When we compare this with Figure 1 (vertical-standing) we find that it takes 3 times as much motion, to invade the "objectionable - uncomfortable" limits; in other words, the body is more sensitive to vertical vibration when standing.

Figure 4—With the subject still reclining and being moved horizontally, parallel to the axis of the body, the reaction is essentially similar to that for horizontal-standing.

Figure 5—Still in a reclining position, the movement now is transverse to the body axis. The human reaction to this agitation is the most pronounced of the various combinations, except for the vertical-standing condition.

In summary, the human body under steady state agitation is most sensitive to vertical motion when the subject is standing and least sensitive when reclining, as shown in Figure 5.

When the movement is confined to the horizontal direction, the reclining body is most sensitive to motion applied transverse to the body

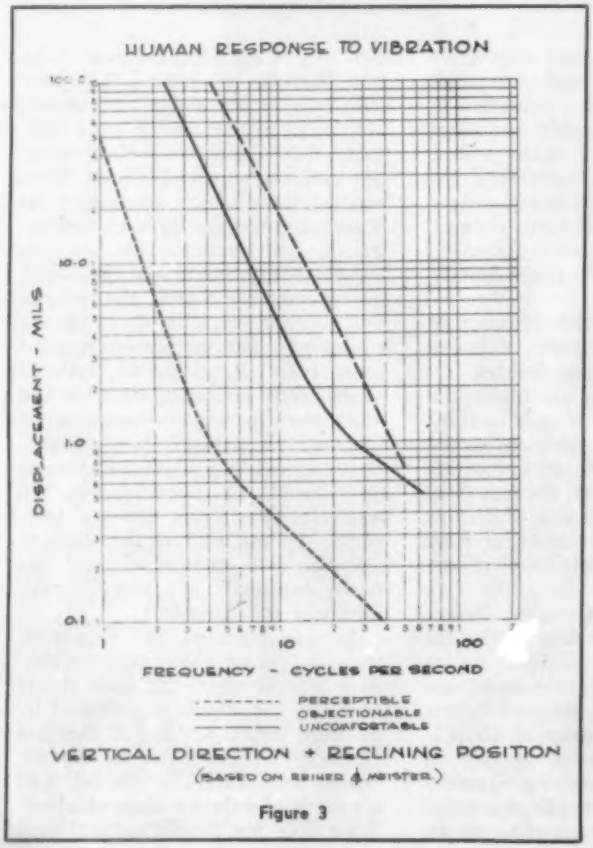



Figure 3

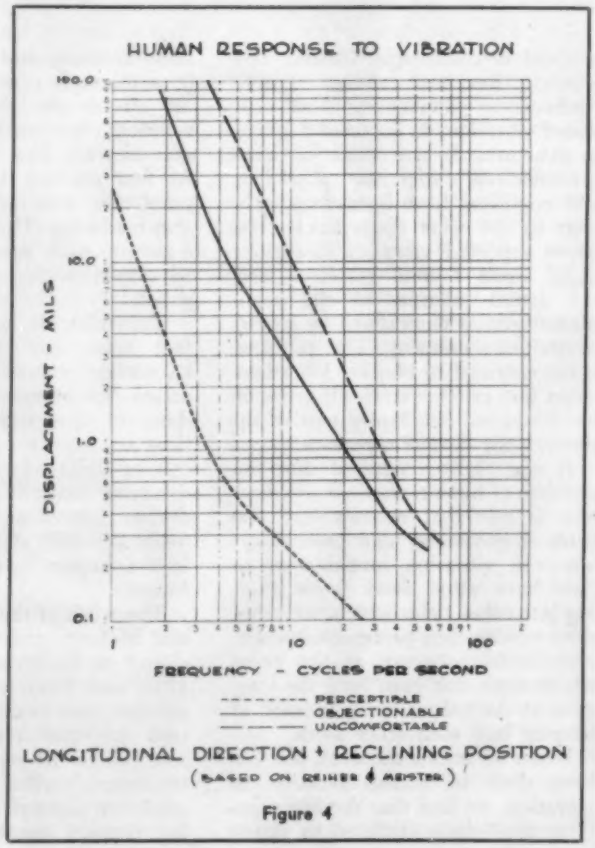



Figure 4

axis, as is shown in the last diagram. Sensations of this kind are experienced in sleeping cars of trains.

Finally, while we have confined these discussions to a motion of 10 cycles per second, we must not overlook the importance of frequency upon these human reactions. For example, in Figure 5, if the frequency were increased 6 times to 60 cycles, the "objectionable" sensations would be experienced at an amplitude of .19 mils, or about 2 tenthousandths of an inch. This is 1/6 of the motion considered to be "objectionable" at 10 cycles. Furthermore, this "objectionable" motion at 60 cycles would not be felt at 10 cycles. Now, if we decrease the frequency to 5 cycles, the "objectionable" sensation would not be experienced until the amplitude reached 5 mils, or 4 times the motion considered objectionable at 10 cycles.

If we extend these curves to the upper left and beyond the limits of the graph (into the range of earthquake frequencies), it would require amplitudes of the order of inches to produce the same degree of human sensation experienced by amplitudes of less than one-thousandth of an inch in the blast frequency range. This seemingly offers some explanation concerning the lay claim "It was worse than an earthquake."

One important phase of human response, not covered by Reiher and Meister, has to do with what is called the "startle effect". This reaction, induced by our hearing apparatus, is known to bring about momentary increases in heart rate and respiration. The source need not be long or intense; it need only be unexpected. It is well established that these sudden disturbances exert a profound influence in our decision that we detest a certain noise, and incidentally, also those responsible for making it.

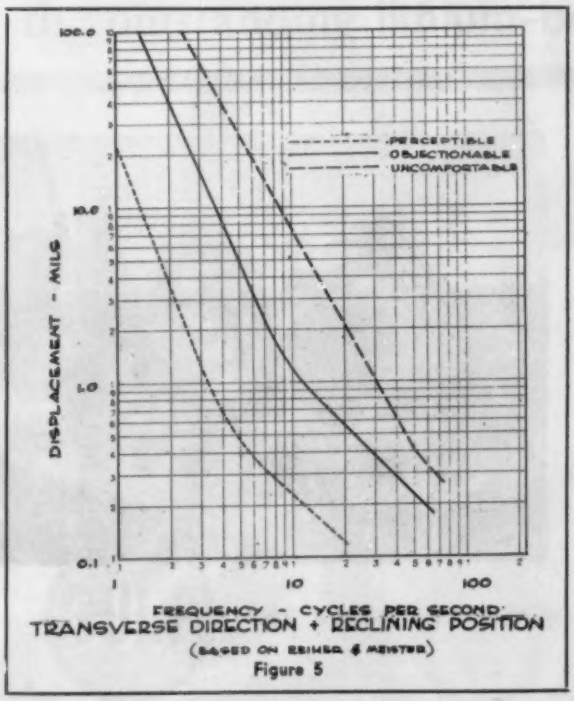
The ear is not the only organ involved. Skin areas, muscles, tendons, joints, and internal organs are excited, as well. The individual or collective effects on these parts of the body frequently cause persons to conclude that the earth or building supporting them is shaking violently, when, as a matter of fact, they are actually being moved through microscopic dimensions.

We must remember that the average person can feel vibrations that are from one-hundredth to one-thousandth part of the magnitude necessary to damage structures. Until these facts are firmly implanted in the public mind, and repeated often enough, problems associated with human response to blast-produced vibrations will continue to be acute.

While the facts we have related point to the road ahead, they do not in themselves hold any immediate application to quarry blasting procedures. They do, however, clearly disclose the urgent need for further investigations into the complexities of human reaction to impact. There is every reason to believe that the body can withstand a greater degree of shock under impact than it can under prolonged agitation. The photo-flash bulb causes only a momentary flutter of the eyelids; yet, were a light of equal intensity shined directly into a person's eyes for but a few seconds, prolonged discomfort would result. Everyone, at some time or other, has had occasion to move a hot pan or object from one place to another. If accomplished quickly, the heat transferred to the body produces only a slight stinging sensation which rapidly terminates. If such an object were handled with a firm grip, a severe burn would quite likely result. We could relate other analogies; however, the two we have mentioned serve to illustrate our point.

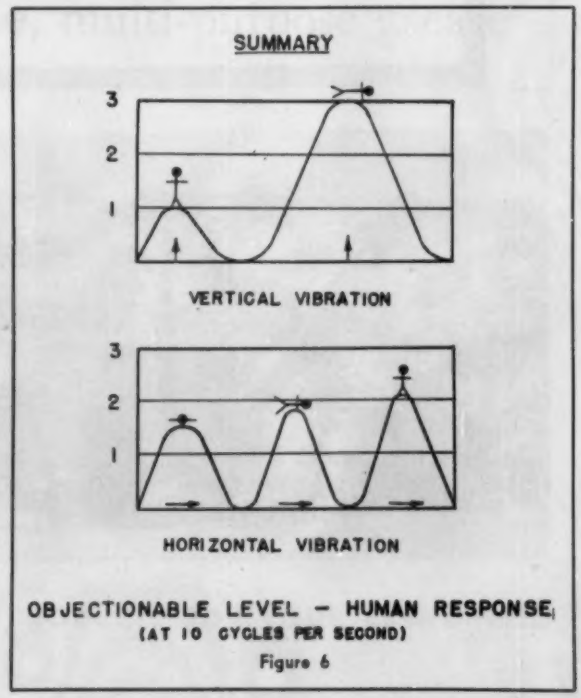
We have made an exhaustive review of our files and endeavored to correlate some of the measured seismic results with the statements we have heard uttered by persons whom we regard as chronic complainers. On the basis of this crude approach, we strongly suspect that blast-produced vibrations might be increased as much as 5 to 10 times that of steady state motion before the "objectionable-uncomfortable" zone is invaded. For many years the quarry industry paid out claims for alleged blasting damage to structures. This practice continued until a group of coura-

*(Continued on page 114.)*




TRANSVERSE DIRECTION + RECLINING POSITION
(BASED ON REIHER & MEISTER)

Figure 5




OBJECTIONABLE LEVEL – HUMAN RESPONSE
(AT 10 CYCLES PER SECOND)

Figure 6

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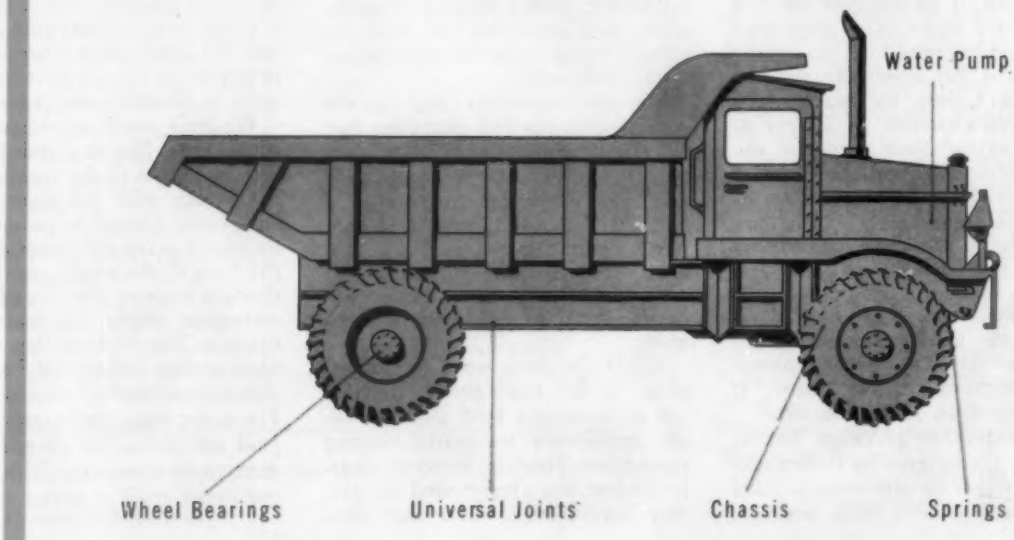

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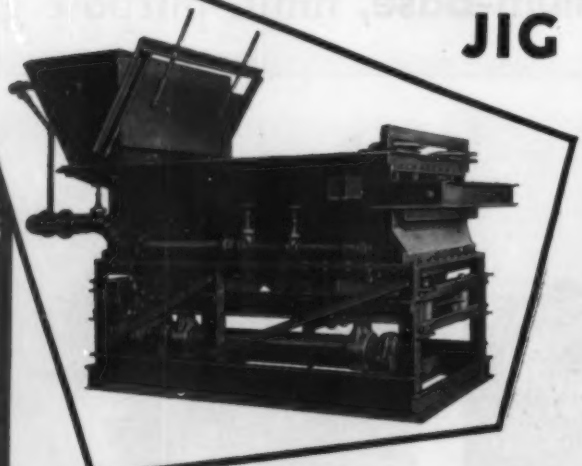

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## Blast Produced Vibrations

*(From page 111.)*

geous operators banded together and underwrote the initial expense of seismographic research. From the knowledge thus gained, hundreds of lawsuits have been successfully defended. We cannot rest upon these achievements. Science goes ever forward. We must take into account that while we are educating ourselves, the public is also better informed with respect to technological advances. The youngsters of today deal in the complexities of UHF, aero-dynamics, nuclear physics, and other scientific subjects to a degree their fathers never dreamed possible.

If we are to stay ahead of those who would destroy our industry, we must undertake the task ourselves. We cannot leave it to others. The problem cannot be solved by the individual efforts of the lone operator; it can be accomplished only through the community effort of many operators on an industry-wide basis.

We, upon whom you call to defend you in the courts of the land, note these public trends with increasing alarm. We deem that it is our professional duty to bring these facts to your attention for such action as you see fit to take. It is up to you, the operators, to protect your vested interest.

## Ponce Cement Corporation Buys American Kiln, Equipment

Scheduled for delivery to the Ponce Cement Corporation, Ponce, Puerto Rico, within the year is a 12- by 500-ft. 8-support Allis-Chalmers kiln, the longest ever to be engineered and designed by the company. Normal rating of the kiln will be about 4,300 bbl. per day.

Other equipment to be shipped from the United States in connection with the firm's expansion program includes two 8- by 40-ft. wet-grinding Compeb mills driven by 1000-hp., 2300-volt, 3-phase, 60-cycle Hytork motors; two full voltage magnetic starters; a 6- by 100-ft. Air-Quenching cooler, and a 2,000-kv.-a. transformer. All of this equipment will be furnished by Allis-Chalmers.

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NELSON E. W. STUART was recently elected president of the Cleveland Builders Exchange, Cleveland, Ohio. Mr. Stuart, a sales representative for the Cleveland Quarries Company, Amherst, Ohio, is completing his thirtieth year with the company.

**Florida plant's output provides calcium carbonate for poultry feed and soil application**

# New Oystershell Plant Makes Wide Variety of Products

A general view of the new oystershell crushing and screening plant of the Florida Oyster Shell Products Company near Tampa, Fla. The dock, primary crusher, and washing screen are at the left.

another ON THE SPOT report

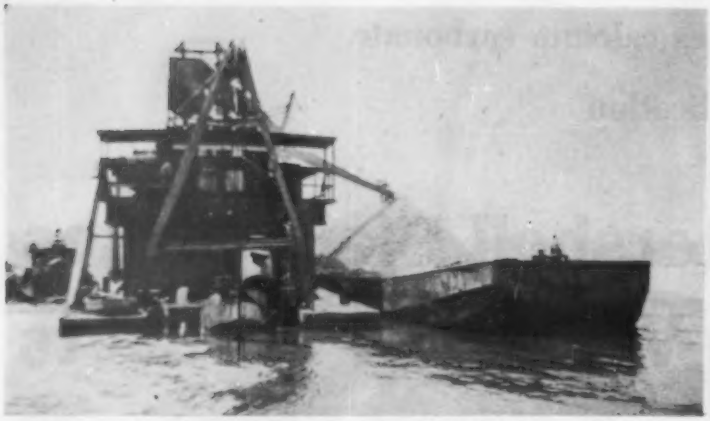
ONE of the newest industries in the rapidly growing Tampa, Fla., industrial area is the oystershell crushing and screening plant of the Bay Dredging & Construction Company on Tampa Bay. This well-designed modern plant went into operation in February, 1954, primarily to produce oystershell grit as a calcium carbonate source in poultry feed. Products now include turkey, hen, and pullet grits, asphalt filler, and agricultural liming material. New products are being added as the markets for them are ascertained. As this area has a rail freight rate disadvantage, all shipments are made by truck, as far as Alabama, Georgia, Tennessee, and the Carolinas. All sales are made through a subsidiary, the Florida Oyster Shell Products Co.

The parent concern, Bay Dredging & Construction Co., was started in 1927 to do oystershell dredging and marine construction work, and to build barges, etc. Some work of this type is still done, and the company builds its own tugs as well. No shell crushing or screening was ever done until this new plant was built; the main outlet previously had been for road material.

Bay Dredging's main yard, office, and shipyard are located at Oak and River Streets, on the west side of Tampa. The company also has a yard on the east side of Tampa at the Tampa Sand & Material Company's site. The new shell processing plant is located on Highland Point on Old Tampa Bay, about 10 miles northeast of St. Petersburg and 5 miles southeast of Clearwater. From these two yards and the new plant, raw shell can be provided for the entire Tampa Bay area, with the minimum haul.

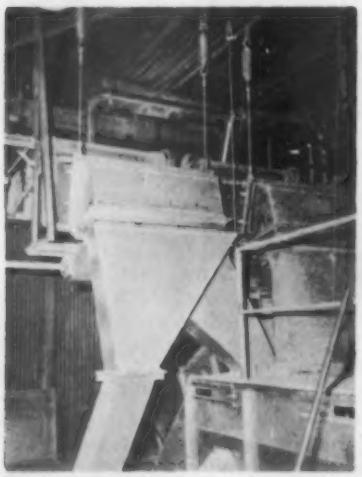
The plant was designed by W. B. Walker, chief engineer for the company, who also selected the equipment. Provision was made for flexibility in the flow-sheet as the company had no previous experience in this field and there was no definite assurance which products would be most in demand. Actually, only a few minor changes have had to be made in the original design. The poultry feed market has absorbed most of the output, and emphasis is now on developing the markets for agstone, asphalt filler, etc. The output of these fine products can be increased by slight adjustments in the flow, and space has been provided for another pulverizer. Much of the equipment in this plant is from Allis-Chalmers. All belt conveyors are from Barber-Greene.

All of the oystershell used by the company in this plant and for other purposes is dredged from shell reefs in Tampa Bay under government lease. The dredge is free to move around, provided that no shoals are left. Actually, dredging is being done to a depth of 32 ft. with the *Alsatia,* a suction dredge with a 12-in. Morris centrifugal dredge pump and a rotary cutter head. Two Fairbanks-Morse diesel engines are used—a 240-hp. for the pump and a 150-hp. for the generator which furnishes all other power and lighting requirements. Gravity screening and washing is done on board to get rid of most of the dirt and other undesirable matter. This dredge is



The 12-in. suction dredge "Alsatia" loading shell on one of the 750-cu. yd. flat-top barges used to haul to the plant and yards. Gravity screening and washing is done on board to remove most of the dirt and other undesirable matter.

The hammermill-type primary crusher which operates wet to remove mud from the shells. The amount of water needed, depending on the quantity of mud on the shells, is added through a nozzle.



These two preliminary sizing screens in the plant make chicken-size product. The bottom deck has repulping pockets which tend to spread the shell evenly across the full width of the screen.

worked continuously and is equipped with living quarters, kitchen, etc.

The shell is loaded onto 32- by 130-ft. flat-top steel barges which have about 8 ft. draft when loaded to their 750-cu. yd. capacity. Five company-owned barges and five diesel tugboats ranging from 165 to 300 hp. haul the barges one at a time to the new plant or one of the two yards—each a distance of about 15 miles. For the plant the tugs come in to the dock on the Cross Bayou Canal, which was dredged out by the Army during the last year.

At the plant dock the shell is unloaded from the barges by a Koehring 304 diesel crane with a 1½-cu. yd. Owen clamshell bucket into a 60-ton hopper. The shell weighs about 1,500 lb. per cu. yd. at the dock. A Barber-Greene reciprocating feeder discharges the shell from the hopper onto a 24-in. by 165-ft. belt conveyor. This conveyor is horizontal for most of its length, so that arrangements can later be made for stockpiling and reclaiming if this should become necessary. The conveyor is inclined to discharge into the No. 424 Allis-Chalmers Pulverator primary crusher. This unit is driven through Texrope by a 100-hp. wound-rotor motor, the speed of which can be regulated by a drum controller. When finer sizes are required, the hammermill is speeded up. Grinding is done wet, water being added through a nozzle; the amount of water depends on the amount of mud on the shells.

This hammermill has no grates, and its product contains about 60 percent material ranging from ¾ in. to dust. A 24-in. by 125-ft. belt conveyor carries this to a 6- by 12-ft. Allis-Chalmers 2-deck Low-Head screen which is equipped with ⅝-in. and 0.131-in. wire cloth on its top and bottom decks, respectively. Water sprays wash the material on

This vibrating scalping and washing screen returns oversize to the crusher.

both decks. The bottom deck has repulping pockets, and water jets set up a swirling action in them which removes any mud or foreign matter still adhering to the shell. The pockets also tend to spread the shell particles across the full width of the screen, providing more efficient screening and higher output. Water used in the hammermill and on the screen is supplied from a 275-ft. deep well by a 40-hp. pump.

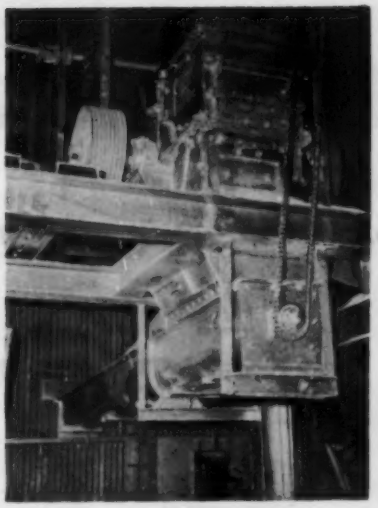
The undersize from the bottom deck flows with the water several hundred feet through a pipe to a 40-acre settling pond. This material is reclaimed as desired and sold as asphalt filler, agstone, etc. Oversize off the top deck is returned on a short belt conveyor to the hammermill.

Material retained on the bottom deck of this screen is carried on a 24-in. by 120-ft. horizontal belt conveyor to a radial stacker conveyor. This has a 24-in. by 119-ft. belt conveyor mounted on a structural steel framework which runs on a circular track over an arc of 340 degrees. The material is discharged from a height of 40 ft. and can build up a storage of 5,000 tons without rehandling. The shell is allowed to dry in storage before being rehandled by the same crane direct to a 20-ton plant feed bin. If desired, the stacker can feed wet shell direct to this bin. Two men can easily push the stacker into position.

A reciprocating plate feeder discharges from the bin to an 18-in. by 126-ft. belt conveyor to the plant at the rate of about 15 t.p.h. This conveyor discharges into the 7- by 60-ft. Louisville indirect-heat rotary drier which is driven by a 50-hp. motor and fired with Bunker C fuel oil by a Ray burner through a firing chamber. A 250-deg. temperature is main-

Left: The 7- by 60-ft. indirect-heat rotary drier which reduces the moisture content of the shell from as high as 18 percent down to 0.25 percent.

Right: The 24- by 20-in. pulverizer which reduces plus ⅜-in. material from the screens.



tained, and moisture content is reduced from as high as 18 percent down to about ¼ of 1 percent.

A 40-hp. fan induces draft through the drier and into a pair of 7-ft. dia. cyclones. These are followed by an 8-ft. dia. cyclone with water sprays. Material from all three cyclones also flows to the settling pond.

The dried crushed shell is discharged from the drier through a chute to a 40-ft. bucket elevator in the main plant building. A higher elevator would have been preferred; but the proximity of the plant to the airport required restriction to this height, and the plant had to be designed to fit. About 5 ft. of additional height was gained by the use of a screw conveyor to feed from the elevator to the two 4- by 8-ft. Allis-Chalmers 2-deck Aero-Vibe screens which are side by side. These are fully enclosed and are equipped with ⅜- and 0.129-in. wire cloth on their top and bottom decks, respectively.

The oversize from these screens is chuted to a Stedman 24- by 20-in. Type A hammermill. This also has no grates and is driven by a 40-hp. motor. A screw conveyor carries its product back to the bucket elevator ahead of the screens, forming a closed circuit. Material retained on the bottom decks of these screens is chuted to a 27-ton bin as hen-size shell.

Material through the bottom decks of these two screens is carried by a screw conveyor to a third Aero-Vibe screen. This unit is identical with the others except that it has 0.11-in. and 20-mesh cloth on its top and bottom decks, respectively.

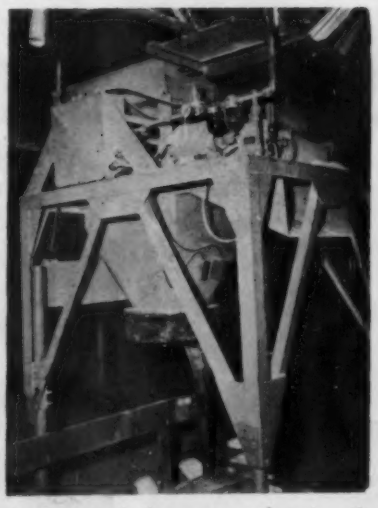
Material over the top deck of this screen goes to a pullet bin; that retained on the bottom deck goes to a chick bin. Material through the bottom deck (minus 20-mesh) is taken by a screw conveyor to a pile outside the building which is wetted down to prevent dusting. This material is sold as agstone or filler. The four screw conveyors in this department are all driven through chains and a shaft by one 7½-hp. motor.

Of the 15 t.p.h. of shell fed to the drier about 12 t.p.h. is hen size. Production of the other three sizes—pullet, chick, and agstone—is about 1 t.p.h. each. Waste is only about ¼ t.p.h. The output of agstone can be considerably increased by putting grates in the hammermills and changing the openings on the first screen.

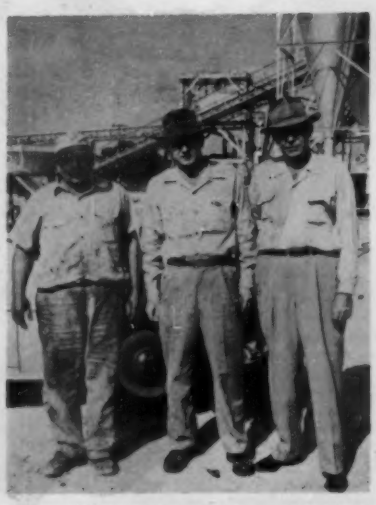
The hen hopper is located directly over the bag packer and feeds into it by means of a short belt conveyor feeder. When any of the other sizes is being packed, a belt conveyor carries it to a smaller hopper over the packer. The Inglett & Corley, Inc., packer (sold by the Union Bag & Paper Corp.) is an open-mouth automatic packer. The bagger has a weigh hopper which can be set at any desired weight between 25 and 80 lb. The weigh hopper is now set at 66 lb.; and when the tripper automatically shuts off the flow, this weight is brought up to exactly 80 lb. by the material on the belt feeder. The flow gate can be adjusted to any desired speed, so that the automatic cycle will fill the bags at the same rate, regardless of size. Vibrators on the hoppers keep the material flowing freely. St. Regis 3-ply open-mouth paper bags are used, in 25- and 80-lb. sizes. Each of these sizes requires a separate spout which can be quickly installed.

This bagger is so fast—up to 20 bags per minute—that it keeps well ahead of production, giving the six men in that department time to store the bags or load them into trucks for shipment. When packing, one man operates the packer, another folds the tops of the bags, and a third man sews them with a Union Special sewing machine. Two men

*(Continued on page 131.)*



A closeup of the open-mouth automatic packer used to fill 25- and 80-lb. bags.



Left to right: E. Riens, plant superintendent; W. B. Walker, chief engineer; and Edward Medard, vice-president of the Florida Oyster Shell Products Co.

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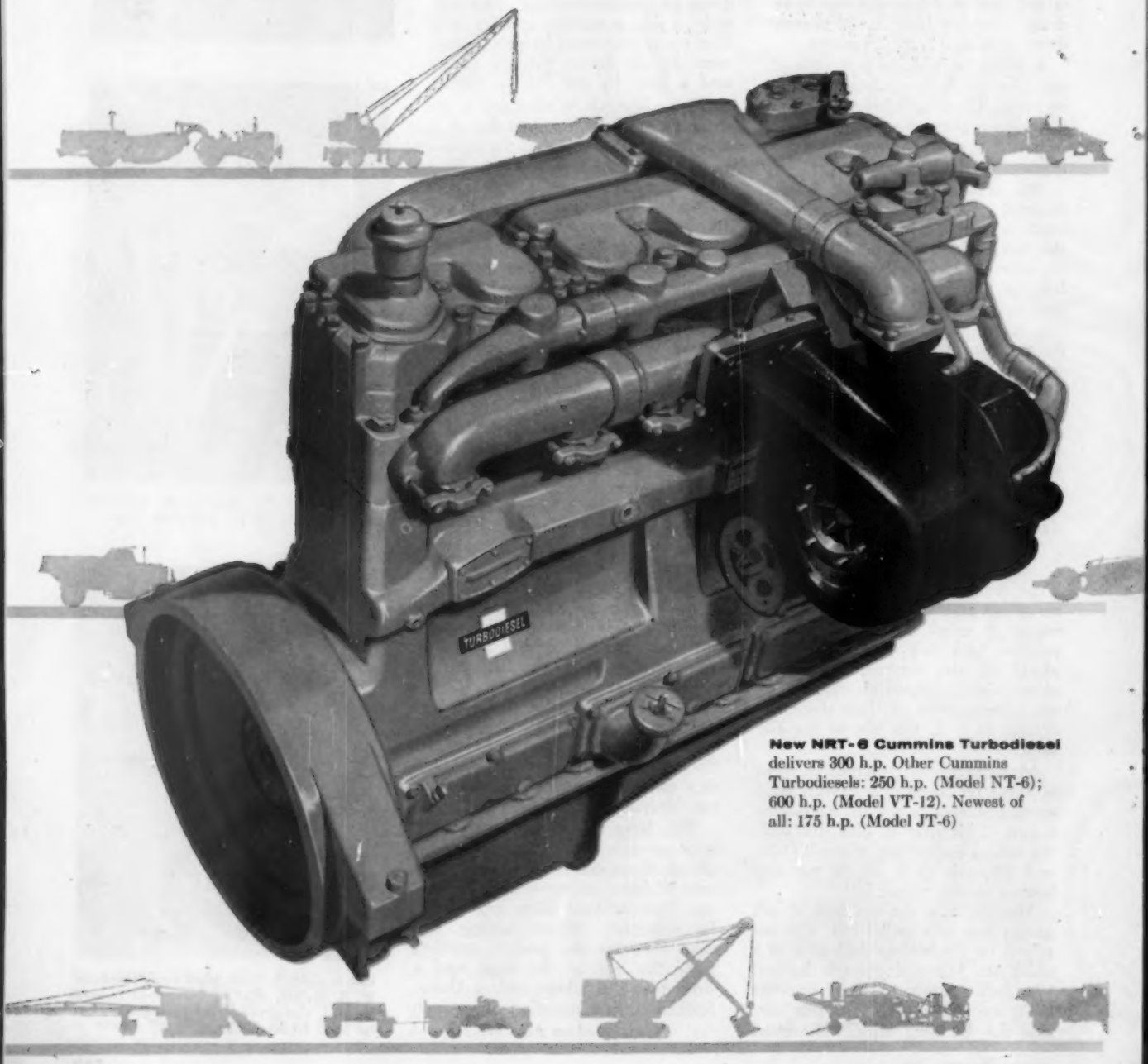
# New Cummins

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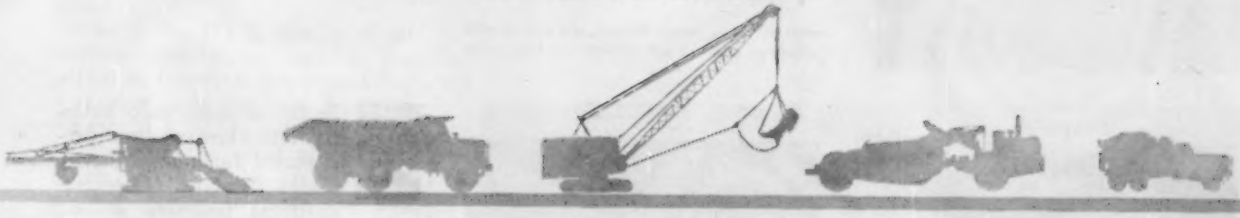
# Turbodiesels



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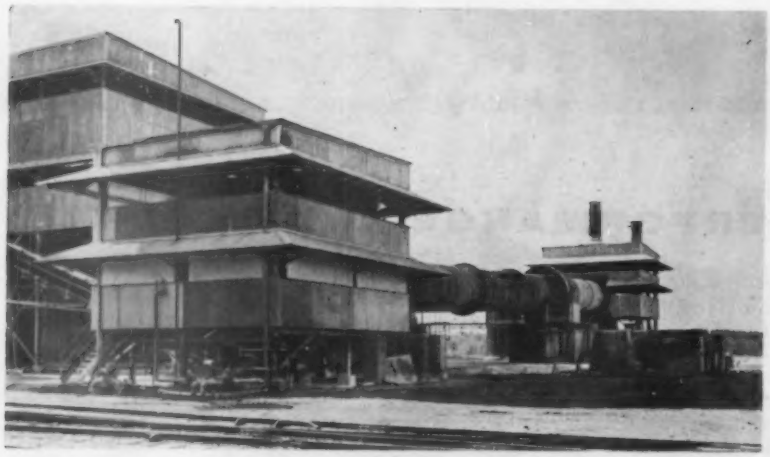
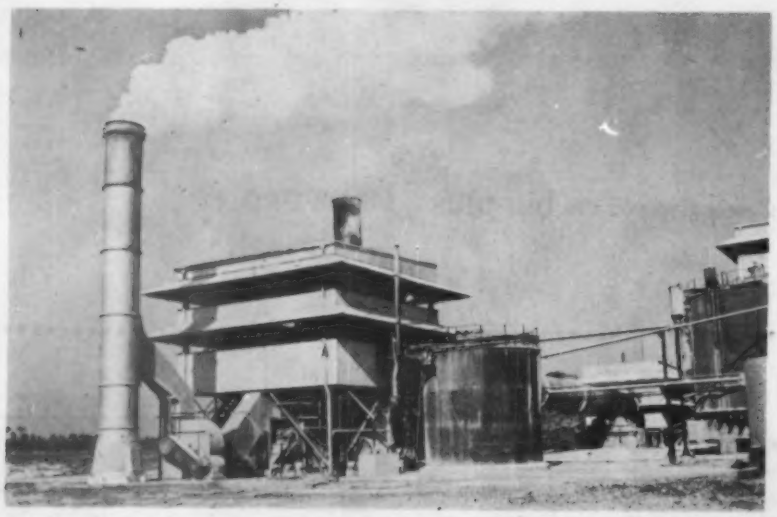
PQ6

# Lime Recovery System Used At St. Regis Pulp and Paper Mill

By KENNETH A. GUTSCHICK



A general view of the rotary kiln plant used at the St. Regis pulp and paper mill, Jacksonville, Fla., to recover lime from the calcium carbonate sludge produced in the causticizing department.



Another general view of the lime plant, taken from the feed end. The 34,000-gal. calcium carbonate mud tank is at the right.

another ON THE SPOT report

In the sulphate pulp industry, lime recovery from precipitated calcium carbonate sludge is one of several chemical processes utilized in order to attain economical operation. This article deals with a typical lime recovery system in use at the recently-built St. Regis Paper Company pulp and paper mill near Jacksonville, Fla. This plant, one of the most modern and efficient in the industry, is fully integrated, producing Kraft pulp, paper, and board at the rate of 100,000 tons per year.

The lime recovery system incorporates a 9- by 175-ft. rotary kiln, which produces about 100 tons of lime per day, the recovered lime comprising about 95 percent of the total lime used in the causticizing department. In the sulphate pulp process lime plays a major role, being a part of a closed cycle. This cycle includes hydrating the lime, causticizing the green liquor, recovering and reburning the calcium carbonate sludge, adding fresh make-up lime, and repeating the cycle. To produce one ton of pulp at the Jacksonville mill, an average of 450 lb. of process lime and 25 lb. of purchased lime is used.

In this chemical process the quicklime is slaked in a solution of green liquor (sodium carbonate and sodium sulphide derived from the recovery boiler), the action occurring in a continuous lime slaker. The material is then causticized in a battery of three reaction tanks, the process yielding caustic soda (used in the pulp digester) and a byproduct—precipitated calcium carbonate. These products are then separated in a four-tray white liquor clarifier, the clear liquor returning to the digesters and the precipitate

to a lime mud washer. This final washing removes additional caustic soda, leaving less than 1 percent $Na_2O$ in the lime mud. The slurry, at 40 percent solids, is then pumped to a storage tank of 34,000 gal. capacity.

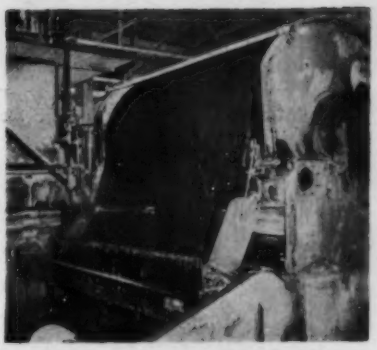
Before entry into the kiln the mud is transferred by a 2-in. pump to a 6-ft. dia. by 8-ft. mud filter, which dewaters the slurry, thickening it to 55 percent solids. This unit, rotating at ¼ to 2 r.p.m., also washes the mud further, reducing the soda content to less than 0.5 percent. The filter cake is fed to the kiln by a 9-in. by 16-in. screw conveyor, which extends 18 in. into the kiln; a part of this unit is housed in a water-cooled jacket.

The 9- by 175-ft. kiln is of all-welded construction, and is supported on two tires; it is mounted on a slope of ½ in. per foot. The drive consists of a 50-hp. motor and gear reducer. In the event of electrical power failure, there is a standby gasoline engine to drive the kiln. Normal operating speed is 80 r.p.h.

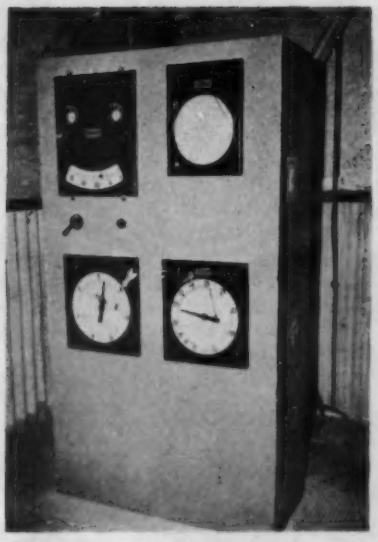
To effect better burning, the kiln has a 19-ft. 10-in. long chain section beginning 5 ft from the feed end. The loose hanging chains are of coil proof construction, ⅝ in. in size and 6½ ft. long; they are spaced on 17-in. centers longitudinally and 18.8-in. centers transversely.

The kiln is lined with 6-in. refractory lining. Alusite brick is used in the hot zone (the 50-ft. section from the discharge end) and fire brick in the remainder of the kiln, with the exception of the first 10 ft. of the chain section. (The original brick in this 10-ft. section was replaced by castable refractory lining.)

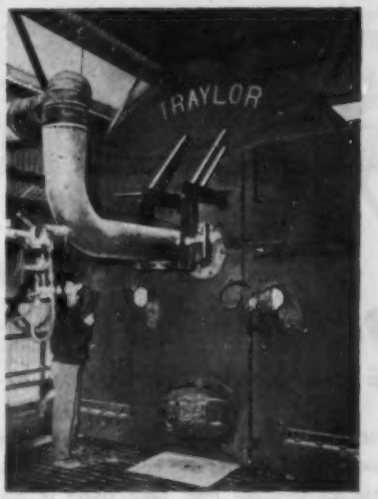
The kiln is served by a fuel oil firing system in which the oil is pre-



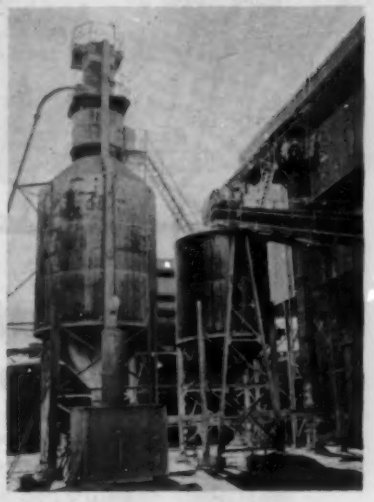
The mud filter, which thickens the kiln feed to 55 percent solids; a screw conveyor transfers the filter cake to the kiln.



Right: The kiln control panel used for measuring and controlling the burning operation.

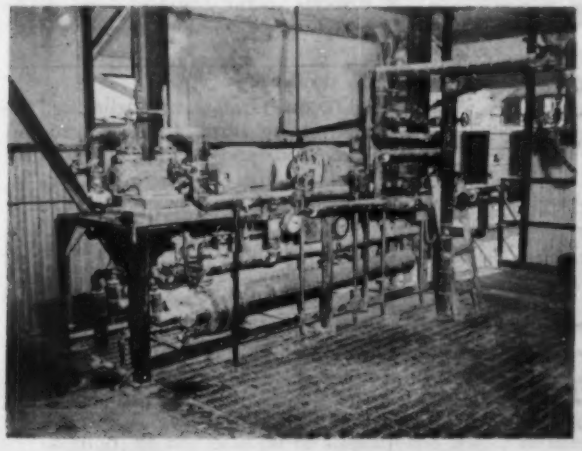



A view of the firing hood and burner pipe for the 9- by 175-ft. rotary kiln; an optical pyrometer measures the hot zone temperature, which averages 2,200 deg. F.

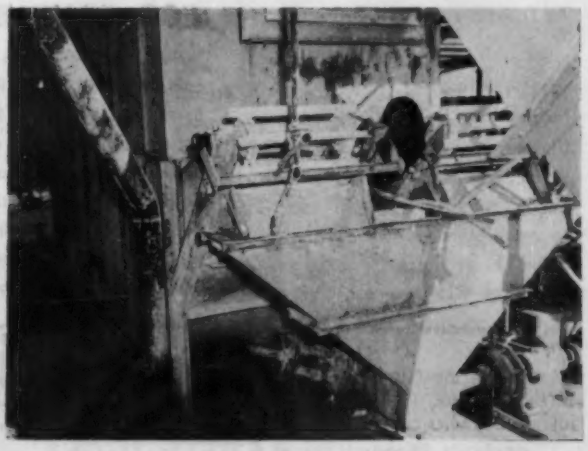


The lime storage system, with the purchased pebble lime bin (left) and the process lime bin (right). An air system is used to transfer commercial lime from cars to storage.

Below: The fuel oil firing system consists of tubular-type steam heaters and pumps. (One is standby.)



Below, right: The exhaust gas is cleaned in this hydrostatic precipitator; the two rake conveyors shown in the foreground return the recovered solids to the system.



heated to 185 deg. F. by a tubular-type steam heater before being pumped to the burner. An extra pump and heater are on standby service. Primary combustion air is provided by a blower fan having a capacity of 1,900 c.f.m.

The burning operation is carefully controlled through various instruments mounted on the kiln control panel. Draft pressure is measured and controlled automatically by an induced-draft fan damper. An optical pyrometer measures the hot zone temperature (averages 2,200 deg F.), and a thermocouple measures the exhaust gas temperature (averages 800 deg. F.). The retention time for the material is about 1½ hours.

The waste gas is cleaned by a hydrostatic precipitator, in which the combined action of centrifugal force and thorough intermixing of the dust-laden air with the water scrubs the air. The sludge is collected in a hopper and removed by two slow-moving rake conveyors, the material returning to the system. The gas then passes through the induced-draft fan and a 5- by 50-ft. steel stack to atmosphere. There is a second stack (25 ft. in height) which is used when the scrubber is not in operation.

Dave Roberts, plant engineer (left) and J. A. Harrison, pulp mill manager.

Following burning, the lime is discharged to an inclined drag chain conveyor (200-ft. centers) and transferred to a 75-ton steel bin. Adjacent to the process lime bin is a 150-ton bin of similar design used for storing purchased pebble lime. Both bins discharge to a 9-in. screw conveyor leading to the causticizing department.

Pebble lime is brought in by box car and air-transferred to storage. The conveying system incorporates a positive displacement exhauster, a four-compartment cam-operated filter, a rotary discharge lock, a motor-operated gate, a single storage cyclone receiver, and high-level bin indicators. The makeup lime is added intermittently in the circuit; it averages about 25 lb. per ton of pulp produced. Thus only about 200 tons of lime are purchased monthly.

The entire construction of the St. Regis mill was supervised by J. H. McCarthy, chief engineer of the Pulp and Paper Division. J. A. McDermott is mill manager, Dave Roberts, plant engineer, and J. A. Harrison, pulp mill manager.

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Tecon, Grafe, and Callahan, the contracting firm for the crushed stone and sand needed in constructing the multimillion-dollar St. Lawrence River power project near Norfolk, N.Y., expects to reach a peak load of 150 carloads (11,250 tons) of aggregates a day. Fifty carloads of machinery and equipment and an 85-ton crusher will be brought to the dam site. The New York Central R.R. will construct a siding from the quarry to the existing Central and Terminal lines.

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# Maule Prepares to Serve Rapidly Growing Area South of Miami

## new crushed stone plant also supplies ready-mix and concrete block

another ON THE SPOT report

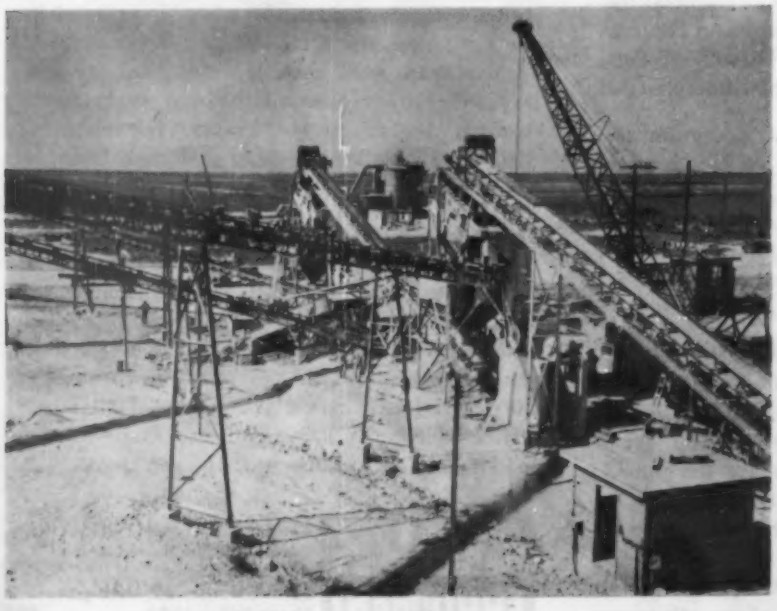
FLORIDA, the Sunshine State, which has been one of the fastest growing in the nation during the last ten years, is continuing that rapid pace, particularly in the southeast coastal section, where home building and business construction are proceeding at an amazing rate.

During 1954 the four counties along Florida's southeast coastal area—Dade, Broward, Palm Beach, and Monroe—showed a population increase of more than 100,000, with an accompanying industrial expansion. Dade County alone now lists 1,600 industrial plants in its area.

South of Miami to Key West examples of this rapid growth are visible on every side. Large home developments, stores, and business structures give ample evidence of this increase in permanent residents.

To serve the increased population south of Miami and throughout the Keys, Maule Industries, Inc., early in 1955 put into operation a new, modern crushing plant, concrete batching plant, and concrete block plant, located on Bauer Drive, east of South Allapattah Road in South Dade County, about 20 miles southwest of downtown Miami.

A general view of the South Dade plant of Maule Industries, looking from the truck ramp. Stockpiling conveyors are at the left.



The plant has an estimated capacity of 250 cu. yd. of stone per hour. Its concrete batching plant has a capacity of 100 cu. yd. per hour, and the block plant is capable of turning out 1,800 units hourly.

Impetus for building this plant was the receipt of a preliminary order for 500,000 tons of aggregates for the construction of the Homestead Air Force Base — an estimated $82,000,000 project which will require two years to build.

This project, plus the steadily increasing demands for building materials and supplies brought on by the rapid growth of the area south of Miami, prompted Maule Industries, Inc., Florida's largest producer of building materials, to build a plant capable of handling all the requirements for the entire area.

The huge Air Fore project is just three miles from Maule's South Dade plant in an area which is growing consistently and requiring more and more residential, commercial, and municipal construction.

This South Dade plant has a 480-acre deposit of oölitic limestone which is expected to last 15 to 20 years. This rock is similar to the "Ojus" rock north of Miami, except that it is harder and more abrasive, having a Los Angeles abrasion test of 40. The overburden averages 18 in. in depth and is removed by contract by the Hooper Equipment Company, which does all drilling, blasting, loading, and hauling of quarry material for all of the company's

plants. This is done at a contract price per cu. yd. delivered to the primary crusher hopper. At this plant a 1201 Lima dragline with a 3½-cu. yd. bucket is used to do the stripping and to excavate the rock.

This deposit is only one mile from Biscayne Bay, and the tide of about 1 ft. brings the water about to the top of the deposit. The rock is excavated to a depth of about 30 ft., and is piled up in windrows to drain and dry. The dragline is usually a few weeks ahead of the 38B Bucyrus-Erie dragline used for loading the material. Some drilling and blasting is necssary to break up the deposit. A Joy rotary drill is used.

A fleet of 18-cu. yd. Euclid bottom-dump truck trailers haul to the plant and discharge from a dirt-fill ramp through a 24-in. rail grizzly into a 25-cu. yd. hopper. A jackhammer with a spade bit is used to break down oversize material. Air is supplied by a portable compressor. A McLanahan & Stone 4- by 8-ft. reciprocating plate feeder discharges to a 4- by 8-ft. single-deck Allis-Chalmers scalping screen. The plus 4-in. oversize goes to the 36- by 60-in. Allis-Chalmers single toothed-roll primary crusher. Its minus 4-in. product drops into the screen throughs on the 36-in. by 120-ft. main plan conveyor (No. 1). Like all the other conveyors in the plant, this has Lippmann idlers and pulleys and is driven through Dodge torque arm reducers.

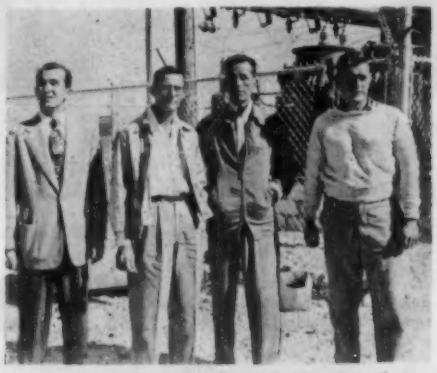
The No. 1 conveyor discharges stone through a split chute to a 5- by 12-ft. 3-deck Lippmann Screenall vibrating screen (A) and a 4- by 12-ft. 3-deck Cedarapids shaker (B), which are arranged back to back. The Lippmann is equipped with 1-in. screen cloth on the top deck, ¾-in. on the middle deck and ¼-in. on the bottom deck. The plus 1-in. stone is chuted to a 4033 Cedarapids hammermill which discharges to a 24-in. by 80-ft. conveyor (No. 3). This conveyor returns to No. 1 conveyor. The ¾-in. to 1-in. stone is chuted t o a 24-in. by 125-ft. Lippmann stockpiling conveyor (No. 6). The ¼-in. to ¾-in. material is chuted to a 30-in. by 105-ft. conveyor (No. 2); minus ¼-in. screenings are piped to a twin 18-in. by 20-ft. Eagle screw classifier.

The Cedarapids screen (B) is equipped with 1-in. screen cloth on the top deck, ¾-in. on the middle deck, and ¼-in. on the bottom deck. Plus 1-in. material is chuted to a second 4033 Cedarapids hammermill, which discharges to the 30-in. conveyor (No. 2). The ¾-in. to 1-in. stone and ¼-in. to ¾-in. material are chuted to the same (No. 3) conveyor. Minus ¼-in. screenings are piped to a 16-ft. Eagle scalping tank. The 30-in. (No. 2) conveyor receiving various sizes, as explained above, discharges to two 4- by 14-ft. 3-deck Cedarapids screens.

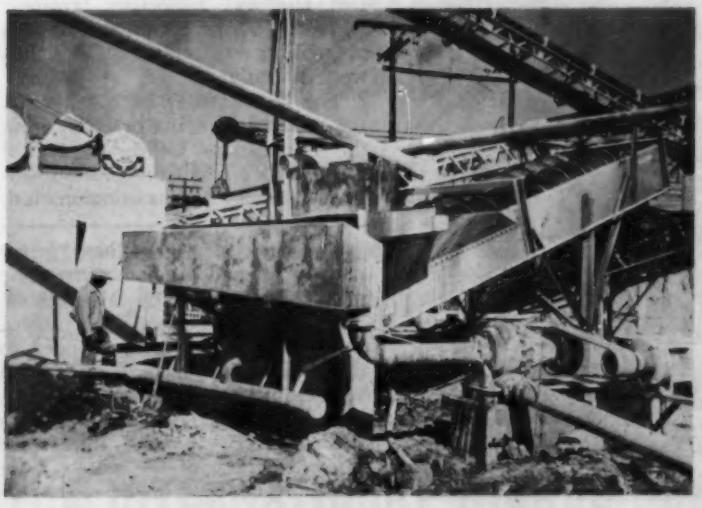
Screen C is equipped with 1-in. screen cloth on the top deck, ¾-in. on the middle deck, and ¼-in. the first 7 ft., ⅜-in. the next 3½ ft., and ½-in. the last 3½ ft. of the bottom deck. Plus 1-in. material is chuted to a third 4033 Cedarapids hammermill. The ¾-in. to 1-in. material is chuted to a 24-in. by 80-ft. conveyor which discharges to No. 6 stockpiling conveyor. The ½-in. to ¾-in. stone is chuted to a 24-in. by 125-ft. Lippmann stockpiling conveyor (No. 8). The ¼-in. screenings from the first 7-ft. section is piped to the 16-in. scalping tank. The ¼-in. to ⅜-in. material through the next 3½-ft. section is chuted to a 24-in. by 145-ft. Lippmann stockpiling conveyor (No. 10), and the ⅜-in. to ½-in. material from the last 3½ ft. is chuted to a 24-in. by 120-ft. stockpiling conveyor (No. 9).

Screen D is equipped with ¾-in. screen cloth on the top deck; ½-in. on the middle deck, and on the bottom deck ¼-in. on the first 7 ft., and ⅜-in. on the next 7 ft. Plus ¾-in. material is chuted to the third 4033 hammermill; ½-in. to ¾-in. material is chuted to No. 8 conveyor; ⅜-in. to ½-in. material is chuted to No. 9 conveyor. The ¼-in. screenings from the first 7 ft. through the bottom

**Right: F. Y. Marshall, assistant safety director of Maule Industries; J. T. Pettigrew, chief engineer; F. S. Davidson, superintendent; and G. Heth, service manager, Lippman Engineering Works.**



**Below, left: The twin-screw classifier which dewaters the sand before it goes to storage.**



**Below, right: A closeup of the plant feeder and the scalping screen over the roll primary crusher.**

deck are piped to the 16-ft. scalping tank; ¼-in. to ⅜-in. material from the next 7 ft. through the bottom deck is chuted to No. 10 conveyor. Plus ¾-in. material is chuted to the third 4033 hammermill; ½-in. to ¾-in. material is chuted to No. 8 conveyor; ⅜-in. to ½-in. material is chuted to No. 9 conveyor. The ¼-in. screenings from the first 7 ft. through the bottom deck are piped to the 16-ft. scalping tank; ¼-in. to ⅜-in. material from next 7 ft. through the bottom deck is chuted to No. 10 conveyor.

The product of the third 4033 hammermill discharges to a 24-in. by 60-ft. Lippmann conveyor which discharges to No. 2 conveyor. The 16-ft. Eagle scalping tank discharges to a 36-in. by 25-ft. Eagle twin-screw classifier. The tank is equipped with five spigots to bleed off any fractions not desired.

Enough excess water is flumed from the scalping tank so that fluid sand containing about 30 percent water is discharged to the screw classifier. Fresh water is added for classifying, insuring the cleanest possible product. The water is supplied by an 8- by 6-in. Allis-Chalmers pump at the rate of 1,000 g.p.m. The overflow from this classifier goes to the same waste system. The dewatered sand is carried on a 24-in. by 125-ft. conveyor to stockpile.

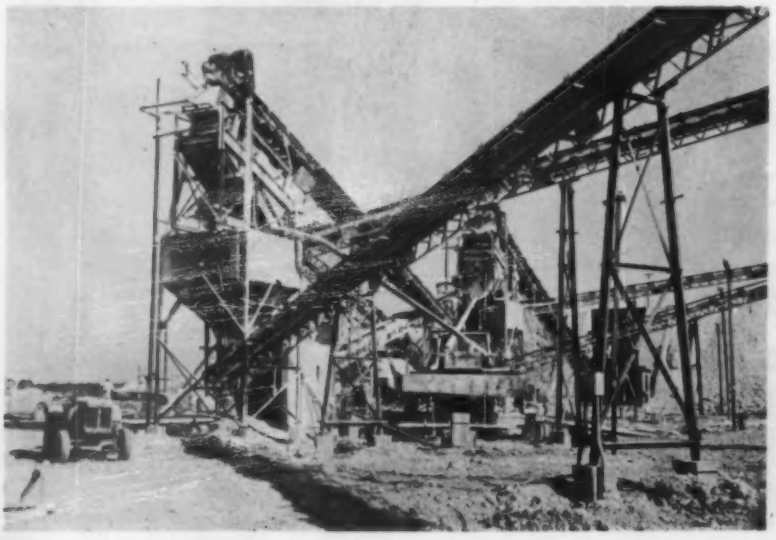
Each of the four stockpiles has a capacity of about 4,000 tons, of which about 1,000 tons (live) is reclaimable through a 340-ft. long tunnel. This is an inverted U-shaped tunnel of Armco corrugated sheet metal resting on a concrete slab. There are four openings under each of the four piles, each with a 20-in. by 5-ft. Lippmann reciprocating plate feeder. Any material or blend can be discharged on the 24-in. by 420-ft. reclaiming belt conveyor, which is arranged so that it can feed to either of the two belt conveyors, one to the asphalt plant stockpile, the other to the bin serving both the ready-mix and concrete block plants.

The ready-mix plant is a 100-cu. yd. per hour central-mixing operation. The block plant has a Besser 2-block Super Vibrapac machine. The Simplicity Systems hot-mix asphalt plant is operated by the Asphalt Materials Company and produces 180 t.p.h.

The entire aggregate plant, including the conveyors from the stockpile, is controlled from an elevated switchhouse room. From his post the operator can see all operations, and control is through individual pushbuttons. Producers in the Miami area are rapidly changing from volume to weight selling. In line with this practice, a 50-ton Fairbanks-Morse truck scale with a 45-ton platform is being installed at this plant.

Above: Stockpiles of finished material with their conveyors and the reclaiming tunnel below.

Below: Another view of the plant (from the finish end)shows the primary crusher and the ramp (background).

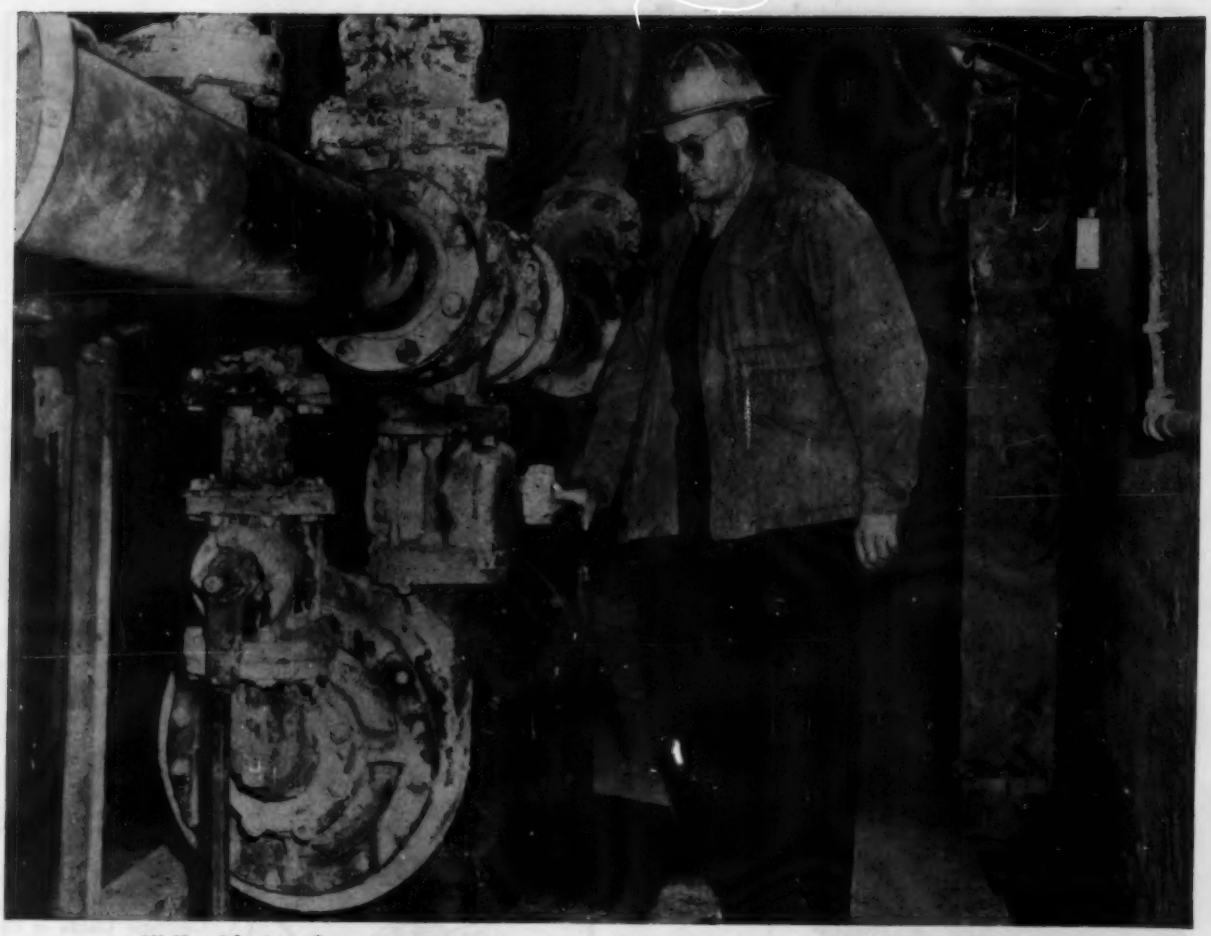


## Report on Gypsum, Anhydrite In Indiana Issued by State

*Gypsum and Anhydrite Deposits in Southwestern Indiana* (Report of Progress No. 8), prepared by Duncan J. McGregor, has been issued by the Indiana Geological Survey. In view of the current activity on the part of several major gypsum producers in this area, this publication is particularly timely. The author discusses the production and uses of gypsum and the physical and chemical properties. geologic association, origin, and distribution of gypsum and anhydrite in southwestern Indiana.

The booklet may be obtained at the price of 50 cents per copy from the Publications Office, Geological Survey, Dept. of Conservation, Indiana University, Bloomington, Ind.

Governor Meyner of New Jersey recently opened his state's first mine safety field office at Morristown. The office, headed by Albert J. Getz, has been designed and equipped to deal with any hazards associated with employment in the state's quarries, sand pits, and mines. Mr. Getz was recently appointed chief mine safety engineer of the state's labor and industry department.



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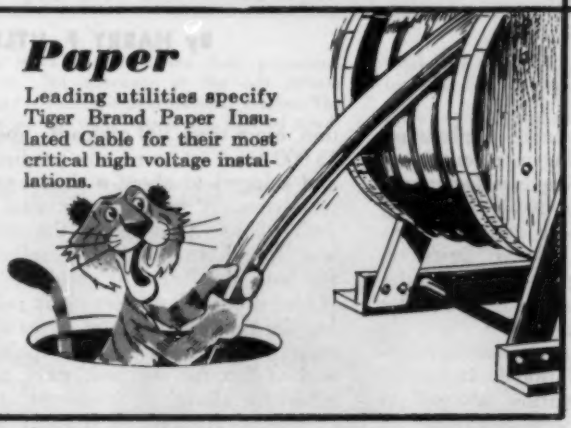

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# Big Oregon Deposit Yields High-Calcium Limestone For Industrial Uses

By HARRY F. UTLEY

another ON THE SPOT report

THE rugged country bordering the Snake River in eastern Oregon is rich in deposits of high-calcium limestone. Except for quarries worked for lime in Wallowa County by the old Enterprise Lime Company and the Baker County operations of the Oregon Portland Cement Company, however, there has been little commercial development of these reserves.

Near Durkee, Baker County, ruins of several old pot kilns attest the efforts of early settlers to burn the stone to yield lime for plaster and mortar. This area, in what is known as Burnt River Canyon, has been subjected to extensive exploration by diamond drilling in recent years by the Morrison-Knudson Company. As a result, the company finally pinpointed an 820-acre deposit of exceptionally high calcium limestone lying close to the main line of the Union Pacific Railroad, 3½ miles southeast of Durkee.

After acquisition, a subsidiary corporation, the National Industrial Limestone Corporation, was set up and main offices were established in M-K headquarters in Boise. The Durkee quarry was opened, and a pilot plant was erected in September, 1953. During the following three months of pilot-plant operation, more than 300 carloads (about 15,000 tons) of stone was produced and shipped to about a dozen prospective users for full-scale tests in their plants. As a result, the stone was found to be highly suitable for both the "straight" and Steffin House processes of beet-sugar refining, for the production of paper and pulp (both sulphate and sulphite), and as flux for the iron, steel, and other metallurgical industries.

Permanent plant equipment was installed at Durkee early in 1954, with production and spur-track capacity for about 1,000 tons per day.

The deposit is known to contain at least 15,000,000 tons of excellent limestone to a depth of 160 ft. and is at a considerably higher elevation than the main processing plant and loading station on the railroad. Winters are comparatively mild, permitting almost continual operation all year to assure prompt availability and delivery of the product at any time.

After the blasting operation, the stone is loaded by a Northwest 80D 2½-cu. yd. shovel into Euclid 11-cu. yd. end-dump trucks which carry it to the primary crusher near the quarry. Stone in the 7- to 12-in. range is scalped off by a grizzly before crushing. This larger size, demanded by some of the paper and pulp producers, is trucked directly down to the loading track. An Allis-Chalmers 36- by 48-in. jaw crusher, powered by a 150-hp. motor, reduces the remainder of the stone to minus 4½ in., and primary sizing is done by a vibrating screen.

After sizing, the stone is stored in truck-loading bins from which the trucks load. Delivery is either to the loading ramps or storage piles at the spur track; or the trucks can discharge to a huge surplus surge pile

Scene at the operation of the National Industrial Limestone Corporation near Durkee, Oreg., showing a truck discharging to the hopper and grizzly ahead of the 36- by 48-in. primary jaw crusher.

The main screen in the final processing setup. The conveyor at the left returns oversize to the impact hammer crusher. The one at the right carries the finished product to the loading stockpile.

Above: The feeder and the impact crusher which does secondary reduction at the final processing plant. This crusher is operated in closed circuit with a 3-deck screen. A portable crushing plant follows this unit.

Below, left: A 2½-cu. yd. diesel shovel loading an end-dump quarry truck at the quarry.

Below, right: Intermediate-size limestone being loaded by conveyor into an open-top car. The screen takes out unwanted fines.

which supplies the final processing plant.

Final reduction and sizing involves a Cedarapids double-impeller impact breaker with a Robins Vibrex 3-deck screen in closed circuit, followed by an Iowa Manufacturing Company Morok portable quarry plant. This equipment is all flexibly tied together with conveyors and surge piles and is pushbutton-controlled to produce needed sizes and to balance that which is trucked down from the primary crusher in the quarry.

As mentioned, the 7- to 12-in. product goes to sulphite pulp and paper producers. The 3½- to 4½-in. material is required by sugar refineries using the Steffin House process, and 2½- to 3½-in. product by refiners who employ the "straight" process. Furnace flux and electrometallurgical stone is processed and shipped in the ¾- to 2½-in. ranges, while ¼- to ¾-in. output is largely utilized as rotary lime-kiln stone by producers of sulphate pulp. The company is developing various outlets for the minus ¼-in. products.

Intermediate sizes of stone are loaded into the cars principally by a belt conveyor fitted with a screen over the discharge end above the cars, to take out any undesired fines. Large rock from the primary quarry plant goes directly into the cars from the trucks which back up a ramp alongside the spur. A clamshell crane loads the finer sizes from a storage pile close to the track.

M. E. Burns is general manager of the National Industrial Products Corp. J. V. Otter is vice-president in charge of development, engineering, and sales. Ted Lewindowski is superintendent of the plant and quarry at Durkee.

## New Oystershell Plant

*(From page 117.)*

load the bags onto 1-ton wooden pallets, and another carries these off with a Clark fork lift-truck. The warehouse has a capacity of 500 tons. Water shipments can also be made from this plant.

Because the plant site was once a mangrove swamp, it had to be filled in 1 to 1½ ft. to bring the ground level 1 ft. above the water table. Further elevation was not advisable because of the building height restrictions of the nearby Pinellas County Airport. Actually, the water table is 3 ft. above sea level, the ground level is plus 4 ft. All machinery must be at plus 7 ft. or higher because the tides sometimes reach that elevation; they are therefore mounted on wooden piling as long as 28 ft. Buildings are of steel, with corrugated metal siding and roofing; foundations and footings are of concrete.

Officers of the Bay Dredging & Construction Co. include the following: D. W. White, president; R. W. Thomas Jr., vice-president and general manager; and E. R. Lewis, secretary. Edward Medard is vice-president of the Florida Oyster Shell Product Co. and general superintendent of Bay Dredging. E. Riens is superintendent of the new plant.

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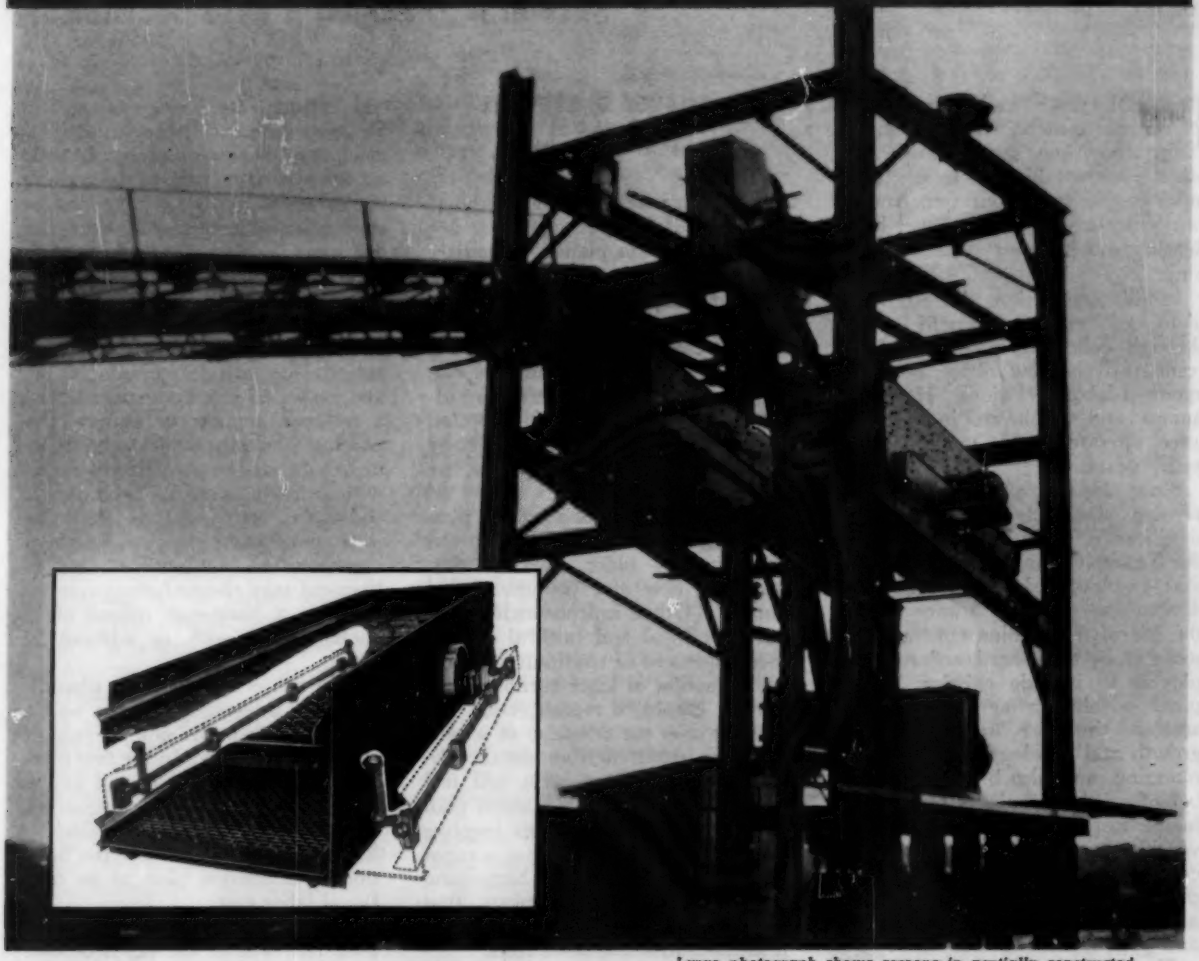
# Another NEW Plant Chooses *SECO* VIBRATING SCREENS



*Large photograph shows screens in partially constructed new plant of Holmes Construction Co., Wooster, Ohio*

## *ONE USER TELLS ANOTHER . . . "SECO GIVES BETTER, SMOOTHER SCREENING"*

Here's another new sand and gravel operation getting off on the right foot with SECO vibrating screens exclusively. The two SECO vibrating screens shown above were chosen by Holmes Construction Company to handle all screening in this new plant at Wooster, Ohio.

The choice of SECO screens in so many new plants today is influenced by recommendations of other satisfied SECO users. One owner tells another . . . you can't beat SECO for performance.

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*What do you know about*

# Pension Planning?

**If you have no employee-benefit plan, suggestions in this article may prove useful in reaching a wise decision.**

By **ROBLEY D. STEVENS**
LL.B., LL.D.
Management Consultant

PRODUCERS and manufacturers of cement, crushed stone, gypsum, lime, sand, gravel, and other nonmetallic minerals, like other employers in our free American enterprise system, have been hearing much about pension planning.

In this connection, the establishment of employee-benefit plans through collective bargaining is a comparatively new phase of management-labor relations. However, unions and employers individually have operated such programs for many years.

Since the end of World War II, pension plans have assumed much significance. Early in 1945, however, the National War Labor Board held that employers should not alter or discontinue group insurance during the life of their union contracts. In some cases the Board ordered employers to include existing benefit plans within an agreement. Such actions therefore stimulated the growth and development of pension planning, and also brought a number of existing employer plans within the scope of union contracts. Favorable tax regulations applicable to employers who set up approved plans also contributed to the growth and development of health, welfare, and/or pension plans.

Should a pension plan be adopted by your company? Such plans have been used by private industry to meet the emergencies of old age for the workers. In fact, the U. S. Bureau of Labor Statistics recently estimated that "more than 3,000,000 workers were covered by some form of health, welfare, and/or retirement plans under collective-bargaining agreements by July 1948."

Among the many industries in our free enterprise system in which pensions are covered by management-labor agreements the following are representative—street railway, clothing, steel, chemical, paper, mining, textile, building trades, fur and leather, electrical machinery, food products, power and communication, automobiles, garment, metal-working, etc. This fact reflects a growing demand for pension plans. Of course, it is not always possible to determine just why management should adopt a pension plan. However, because of the increasing demand for such plans, whatever their purpose, the subject does require careful consideration. In any event, the adoption of a pension plan will be viewed quite differently by the employer, the employee, and the union.

The major aspect of a pension plan is to increase efficiency through the retirement of older workers, thus attracting new and younger skilled workers. Other aspects include reward for loyal and faithful service, encouragement of continuity of service, reduction of labor turnover, improving employee morale, etc.

What does the adoption of a pension plan mean to your firm? Obviously, your management will feel that the pressure for a pension plan on the part of the unions involves the fact that your company cannot support one, also that bargaining over pensions is not necessary, that economically it is unsound, and that it means additional labor costs.

In talking to several workers in this industry, I learned that they, like other employees, feel that they should be rewarded for long, efficient, and faithful service, and not because the unions want a pension plan.

Just what is a pension plan? A pension (or retirement) plan provides regular periodic payments (or annuities) to employees who have retired, or who are about to retire from active employment for one or a combination of reasons; *e.g.*, the employee has reached the normal retirement age, he has served the minimum number of years, or he has become permanently or totally disabled.

During the last few years American industry, for numerous reasons, has witnessed a wide growth and development of pension plans. Usually a pension is paid only to the retiring worker who meets the age and/or service requirements. However, under some pension plans other conditions for retirement are provided. For example, an employee retiring or otherwise leaving a company's employ before the normal qualifying period, but after a stipulated age and/or period of service, may receive a reduced pension or annuity, beginning immediately on separation; or he may receive a deferred annuity, with pension payments beginning at the normal retirement age. If a plan is a contributory one, an employee on separation from service before retirement may choose between an annuity or a lump-sum refund of his contributions, with or without interest.

The subject of pension planning is a very interesting one, as well as a vitally important one to employers in this industry. In the first place, they want to know who will pay for it. The answer to this question will probably always be far from decisive. Employers generally view the adoption of a pension plan as an additional labor cost.

There is probably no one pension plan that will fit the needs of every employer. The individual plan, if actually adopted, should be tailored to meet the situation. However, eligibility for participation in a pension plan is usually based upon service and age, and occasionally, upon union membership requirements. Pensions are paid to eligible workers who have retired or who are about to retire for the reasons cited above. Employees entering service when they are past 45 are sometimes excluded by the eligibility rules.

Usually a pension is paid to eligible employees; and the normal retirement age of 65 (60 for women) is the basis for the qualifications for benefits of retirement. Participation is compulsory in some plans and optional in others.

On the other hand, lump-sum death benefits, payable in the event a participating employee dies before or shortly after retirement, may be included in a pension plan. Some plans, however, under which the employee may continue in service beyond a compulsory retirement age with the employer's permission, do not permit accrual of service during the extension.

The amount of a pension is another subject to consider. However, benefit amounts are stated: (1) as a flat amount, (2) as a fixed amount of percentage of income multiplied by years of service, (3) as an amount purchasable through an insurance policy with contributions on hand, and (4) as the sum of percentage of various portions of the employee's average income.

Your company might find that a monthly pension of $50 will serve the purpose, exclusive of social security old age benefits. But the amount of a pension will of course, depend upon your agreement.

There are various methods of financing a pension plan. For example, it might be a non-contributory one. The contributions might be made solely by the employer, or the employees might contribute say 2 percent of their monthly earnings and a graduated or higher amount after a certain salary. In a contributory plan it is quite common for the employer to match the employee's contributions.

The administration of a pension or retirement plan is another subject to consider. The plan might be administered jointly by a management-labor group, or it might be operated by a special committee set up for this purpose. If a pension plan is adopted by your company, your management should publish the details in simple language for the workers.

In addition, the effective date of a pension plan is extremely significant in determining both an employee's contributions and the service on which his pension might ultimately be based. Its commencement will require various levels of thinking. However, eligible workers should have at least 20 years of employment with your company and should be past age 60.

There is no doubt that the negotiation and contractual arrangements of a pension plan require careful study. Consequently, management should seek the services of its own lawyer throughout the entire process. In addition, pension consultants and insurance firms have adequate means to assist in this undertaking. However, since the final choice of a plan and the provisions thereof will depend upon each individual management, advance planning is required.

In view of the fact that unions have been stirred to sell employers on the idea of pension plans and also because interest in collective-bargained plans has been further spurred by their absence in smaller firms, your management should seek legal counsel. Here is a legal case worth evaluation before arriving at any decision.

The National Labor Relations Board's conclusions that retirement and pension plans are subject matters on which an employer must bargain with the statutory representative of his employees was upheld by the Court of Appeals for the Seventh Circuit, NLRB, 170, F 2d 247. The Court held that all retirement and pension plans, regardless of structure, are within the identical bargaining mandates of the original (Wagner act) and amended act (Taft-Hartley Law) which require an employer to bargain collectively with the representatives of his employes, *i.e.*, the exclusive representative designated to bargain for them, "in respect to rates of pay, wages, hours, or other conditions of employment."

In other words, the court agreed with the NLRB's views that while the provisions do not specifically refer to the matter of retirement and pensions, benefits accrued to employees from such plans are clearly within the statutory concepts of "wages" and "conditions of employment" when viewed within the light of the purposes of the act.

Has the management of your company a blueprint for a pension plan? What kind should it adopt? Who will be eligible? What formula should you use? The demand for a pension plan in your firm may be closer than you think. If your management refuses to bargain over a pension, the union might file a charge with the NLRB.

In any event, you should not wait until you are forced to adopt a pension plan. Rather, you would do well to gather all the facts now and discuss the possibilities with legal counsel. Space does not permit complete elaboration of the details of pension planning. However, many good books on the subject are available at your city library. Since your company is in competition for skilled manpower, as is true of all other economic units in our free enterprise system, it should evaluate the facts now. (For more information, the appended sources should be probed.)

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### Western Gypsum Products Plans Expansion Program

According to a spokesman for Western Gypsum Products, Ltd., at Winnipeg, Man., a general expansion program is planned this year by this firm, which has properties in Manitoba, Alberta, and British Columbia.

Western Gypsum Products was bought last year by the British Plaster Board (holdings) of London, England, from a group of Winnipeg men for about $3,000,000.

### New Drillers' Handbook Lists Speeds of Drilling

Publication of a *Drillers Handbook on Rock* has been announced by the Davey Compressor Company. The pocket-size booklet contains a complete description of many common rocks and instruction on how to judge the speeds with which various rocks can be drilled.

This illustrated handbook may be obtained from the Rock Drill Division, Davey Compressor Co., for $1.50 a copy.

### Three Portland Cement Firms Show Decided Gains in 1954

Last year the Missouri Portland Cement Company showed net earnings of $2,540,033 on sales totaling $15,963,398, as compared with net earnings of $1,746,116 on sales amounting to $13,240,877 in 1953.

A net income of $4,576,644 and sales of $28,170,356 during 1954 were announced by the Alpha Portland Cement Company. These figures compare with a net income of $2,799,104 and sales of $25,686,507 for the previous year.

Oregon Portland Cement Company reports earnings of $715,640 and sales of $6,239,341 for 1954, compared with earnings amounting to $495,809 and sales of $5,385,324 during 1953.

# Utah Concern Makes Potash From Brine At Bonneville Flats

A general view of the Bonneville, Ltd., plant on the salt flats near Wendover, Utah, where 75,000 tons of potash is produced annually. Featured in this view is the mill dump, where the wagons drop their loads. Inside the mill there is a three-drum cable hoist with which the operator can manipulate the scraper shown in the picture. He can drag material from any part of the dump to the mill as may be required. The operators (on three shifts) feed the mill by means of this scraper at a regular and even rate of 1,000 tons of crude salts in 24 hours.

A FEW miles from Wendover, Utah, at the western end of the famous Bonneville Salt Flats, is the mill of Bonneville, Ltd. This operation annually produces approximately 75,000 tons of potash testing about 95 percent purity from brine in these flats. The bulk of its product is shipped to fertilizer mixing plants east of the Mississippi, where the potash market lies.

Although the history of the exploitation of the brines in the Bonneville Salt Flats dates back to World War I, to those who enjoy the romance of history, the real story of potash production in this region goes back through many eons to Lake Bonneville. This body of water once covered much of what is now known as Utah. In the course of evaportion, old Lake Bonneville eventually disappeared, leaving the Great Salt Lake and the Great Salt Lake Desert, of which the Bonneville Salt Flats are an important part.

Operations of Bonneville, Ltd., are enormous in scope. The company controls 60,000 acres of salt flat and also 7,000 acres devoted to evaporation ponds in an area one mile wide and ten miles long.

From this vast area, Bonneville, Ltd., produces its current output of 75,000 tons of potash each year. This is accomplished by extracting the potash from a brine collected from clay beds under the salt flats. It is a Herculean operation involving many millons of tons of brine, since one ton contains only 15 to 20 cents' worth of marketable potash.

The brine is collected by a network of over 50 miles of main and lateral canals 3 ft. wide and 14 ft. deep. It is pumped from the canals into a series of evaporation ponds, where the concentration of salt is gradually increased. In the finishing ponds of the evaporation system the salt evaporates to about two parts common salt to one part potash. When it is ready for the harvest, the material is hauled to the mill of Bonneville, Ltd., where by a flotation process the potash is separated from the salt, conveyed to a 400-ton silo storage bin, and eventually trucked two and one-half miles to a railroad siding for shipment.

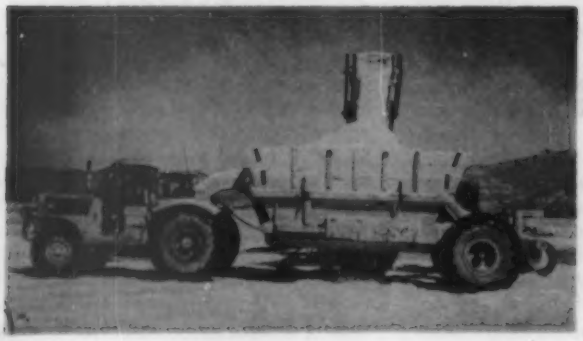
At no time does the process involve the surface salt that nature has so abundantly provided in the area; this surface salt contains virtually no potash.

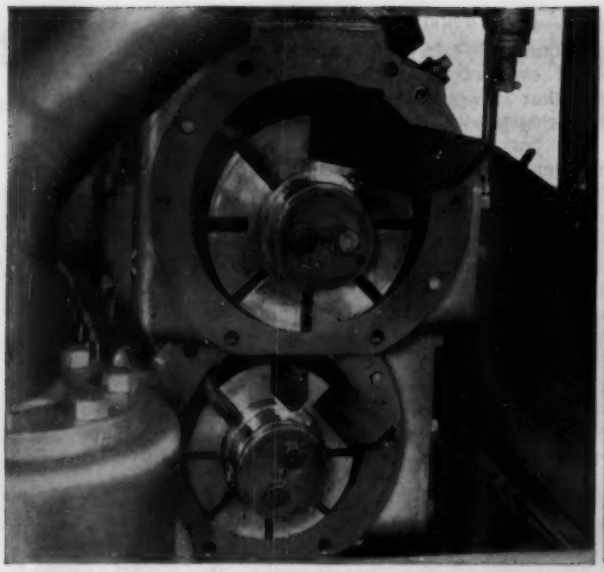
Commercial potash production in the United States was started in the Bonneville area to supply a demand created by World War I. The syndicate now known as Bonneville, Ltd., was formed in 1935. After several years of experimentation the operation began to reach quantity production at about the time World War II conditions made the shortage of potash acute. By 1943 production had mounted to 23,000 tons, as compared to the current 75,000-ton figure.

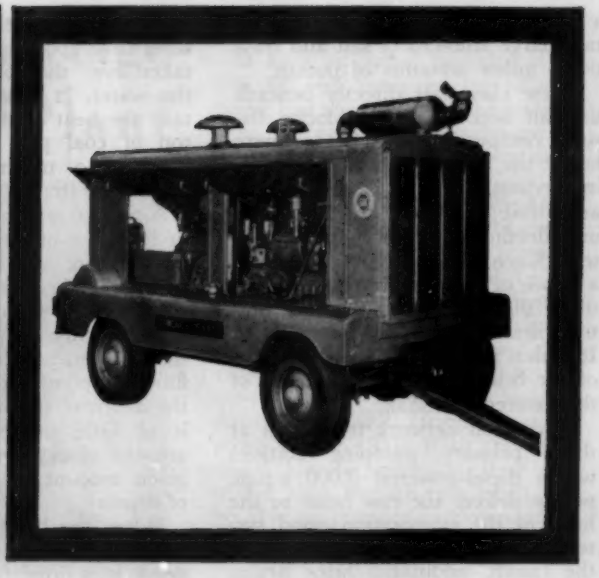
The Bonneville Salt Flats are covered with a layer of salt varying from 3 ft. deep to a feather edge. Below the surface are clay flats which were developed during the time Lake Bonneville was an enormous body of water. As the lake water evaporated,

A diesel powers the pump delivering raw brine to the head of the evaporating pond system. Brine, gathered in collection canals from clay beds below the salt flats, is evaporated in the pond system and potash is obtained by the flotation method at the mill nearby. Bonneville, Ltd., produces 75,000 tons of potash annually.

A tractor and a bottom-dump wagon, equipped with sideboards, is loaded with salt by a tractor-drawn loader. Each wagon carries a 20-cu. yd. load.







# super simplicity

## an outstanding advantage of the new water-cooled GARDNER-DENVER ROTARY 600

In minutes only . . . your own compressor man removes all compressor blades for inspection or replacement.
Remove a dozen cap screws . . . off come the end plates . . . out slide the blades . . . and bearing assemblies are not disturbed. That's super simplicity . . . engineered by Gardner-Denver to keep the new rotary 600 delivering air when you need it.

### No Other Rotary Has All These Features—

**Automatic water-cooling** maintains best operating temperature in any weather.

**Water Circulation system** warms up compressor oil before compressor turns . . . eliminates dry starts.

**Finger-tip hydro-shift clutch** disengages compressor load for easy engine starting in sub-zero weather.

**Metered oil flow** assures positive compressor lubrication, sealing and cooling under all operating conditions.

**Moisture eliminator** removes condensation from oil system . . . prevents oil contamination and freeze-up dangers.

**Thriftmeter** — Gardner-Denver's simple, automatic speed control . . . saves fuel . . . saves wear and tear on engine and compressor.

**Inspection covers** provide ready access to all vital parts . . . help you put field maintenance on a routine basis.

Write for additional information.

GARDNER-DENVER

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

**Gardner-Denver Company, Quincy, Illinois**
**In Canada: Gardner-Denver Company (Canada) Ltd., 14 Curity Avenue, Toronto 16, Ontario**

a residual brine was left which contains large amounts of salt and relatively minor amounts of potash.

These clay flats directly beneath the salt deposits are of blocky, fissured composition. At 14 ft. or more below the surface the clay becomes impervious. Thus it is the fissured area that is worked by Bonneville in collecting brine for the canal system. Since these ditches are dug to a depth of 14 ft. with draglines and ditch digging machines, their bottoms are in the impervious material. It is thus possible to obtain drainage of the brine from the full depth of the fissured material.

The canal network terminates at three primary pumping stations where diesel-powered 8,000 g.p.m. pumps deliver the raw brine to the head of the evaporation pond system. As this brine is pumped out of the canals, additional brine drains back into them through the clay fissures, keeping up the level in the ditches.

Because the evaporation ponds are of clay and salt, the brine tends to seep back down through the fissured clay and back into the collection system. To prevent this, the entire pond area has been sealed by trenching down the 14 ft. to uniform clay and filling this trench with a wall of water-impervious clay. Just inside this wall a channel has been built which is kept full of brine. This brine is permitted to percolate down through the fissured clay to solid material and back up to the bottom of the pond, thus maintaining a balance of pressure and preventing seepage loss.

When the brine enters the 7,000 acres of evaporation ponds, the sun takes over the job of evaporating the water. It is said that it would take the heat of three-quarters of a ton of coal per acre per day to evaporate as much water as the sun will evaporate.

A normal season provides from 90 to 100 days of weather suitable for evaporation, and it is important to get quality brine rather than quantity; both these ends are served by carrying only 3 to 4 in. of brine in the evaporation system until the finishing ponds are reached. There the depth of the brine in the ponds is of little matter, since a given amount of evaporation will drop a given amount of potash regardless of depth.

When the brine has reached the proper concentration point in one pond, it is lifted from the discharge end to the inlet of another pond by means of water elevators, motivated by diesel engines capable of moving the solution at the rate of 5,000 to 7,000 g.p.m. Incidentally, these elevators have to be cleaned every two weeks in order to remove crystallized salt. Light charges of dynamite and sledge hammers break the crystals from the flight blades and flumes. A bulldozer and dragline are used to remove the salt from intake and discharge channels.

With the ponds covering large acreages, and the layer of brine so shallow, a continuous breeze—even if gentle—can strip the brine from one side of the pond and pile it against the opposite bank. If this action continues for 24 hours, control of the brine is lost. To overcome the wind problem, baffle walls must be erected from precipitated sodium chloride salt with the aid of diesel tractor-drawn rippers and motor graders. These baffles carry the brine back and forth in the ponds several times before it reaches the discharge point.

Normally the harvest of salt from the finishing ponds begins near the end of the summer months. There is a layer of from 3 to 0.5 ft. of salt ready for handling. At this stage, bulldozer-equipped diesel tractors and motor graders are called on to scarify and windrow the material. A home-designed loader, powered by an 80-hp. diesel engine, and pulled by a diesel-powered tractor, is next in the sequence of events. This rig is capable of loading out 20 tons in approximately 1½ minutes. It loads out the material (weighing one ton to the cubic yard) into a fleet of bottom-dump wagons pulled by rubber-tired tractors. These wagons, equipped with sideboards, carry loads of approximately 20 cu. yd. to the mill. The hauling distance varies from 2 to 5 miles, depending of course, upon which parts of the finishing ponds are being worked.

At the mill the flotation product, running from 85 to 90 percent potash, is washed with clear water to bring the grade to 95 percent. Then, after the final concentrates have been dried in a coal-fired drier, the potash is ready to be shipped—the brine left ages ago by the evaporation of a huge lake at last converted by man, machine, and sunshine into a mineral which helps to grow food.

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**Perlite Institute Members Hear Record Progress Report**

The Perlite Institute held its 6th annual meeting in April at the Hotel Shoreham, Washington, D. C. At this meeting 114 were registered, representatives of 34 perlite producers from 20 states being present. This was the largest meeting ever held by the Institute.

A most encouraging industry report was presented to the members by Richard S. Funk, administrative secretary of the Institute, which indicated that the record 208,000-ton consumption of expanded perlite in 1954 was 19 percent over the previous year's total. It was stated that 35 to 40 percent of all plaster applied in this country last year used perlite aggregate. The Institute approved a new $18,000-a-year basic research program to explore new uses and improved techniques.

In elections held at the meeting Lewis Lloyd, Alatex Construction Service, was named president and J. C. Kingsbury, F. E. Schundler and Co., vice-president. The next annual meeting of the Institute was tentatively scheduled to be held on May 14 to 18, 1956, at Ponte Vedra Beach, Florida.

● Board of directors, Perlite Institute (left to right): J. C. Kingsbury, F. E. Schundler & Co., Inc., vice-president; O. L. Staerker, Tennessee Products and Chemical Corp.; Kirk E. Hazelton, Great Lakes Carbon Corp.; Norman Braun, Cleveland Gypsum Co.; Lewis Lloyd, Alatex Construction Service, president; and Frank Schaffer, Perlite Products Co. T. C. Ward Jr., Perlite Manufacturing Co., was not present for the picture.

# S. California Cement Shortage To Be Eased by New Plant

This view at the Mojave plant of the California Portland Cement Co., shows some of the piers which will support the two 350-ft. rotary kilns. One of the all-welded kilns is in the process of being assembled.

BUREAU of Mines statistics show that, for the calendar year 1954, southern California's production of finished portland cement was 17,973,000 bbl., while shipments for the same period totaled 18,107,000 bbl. Demand continues to exceed production capacity again this year. However, late in August or early in September the new 6,000-bbl.-per-day plant of the California Portland Cement Company near Mojave will swing into production. This additional 2,000,000-bbl. annual capacity, plus some increase in output from other plants now undergoing mill improvements, will go a long way toward making up the deficiency. In fact, some cement officials are even of the opinion that only a slight slackening in the feverish construction pace in that area might conceivably result in a production surplus in the foreseeable future.

The new Mojave plant is being erected for the California Portland Cement Company by the construction firm of L. E. Dixon Company. It will be a dry-process operation employing high-efficiency equipment of the latest design for materials handling, proportioning, burning, and grinding. Its initial 6,000-bbl. daily clinker capacity will come from two 11- by 350-ft. gas-fired rotary kilns. Kiln gases will exhaust by way of combination multiple-cyclone and electrical-precipitator dust collectors to two reinforced-concrete stacks 215 ft. high. Air-quenching grate-type coolers will handle the clinker. Shipments will be largely by rail, the Southern Pacific having completed an 11-mile branch line to the new plant in January, 1955. Much of the heavy equipment and cement from the company's Colton mill for use in building the plant began moving over this spur as soon as the last spike of the track was driven.

A construction view of the new plant. The quarries in the mountains (background) will provide limestone and shale.

While the new Mojave facilities will have an initial capacity of 2,000,000 bbl. annually, the plant is being laid out to permit the installation of additional equipment to double this output at any time without disrupting production.

The company's wholly-owned subsidiary, the Arizona Portland Cement Company at Rillito, Ariz., north of Tucson, has also just added a third kiln, scheduled to begin production late in July, bringing total clinker capacity at Rillito to more than 7,000 bbl. daily. According to Bureau of Mines figures, the state of Arizona used 2,215,056 bbl. of cement during 1954. With the additional kiln in operation, it is estimated that the Arizona plant will be able to produce in excess of 2,500,000 bbl. annually—or more than the entire state used last year.

### Standard Materials Buys Terre Haute Gravel Company

Announcement of the sale of the Terre Haute Gravel Company, Terre Haute, Ind., to the Standard Materials Company of Indianapolis was released recently by the firm's officials. It was stated that the company had been dissolved and the plant and equipment had been sold. Real estate properties have been leased for 30 years to Standard Materials. Approximately 650 acres of land were involved.

Facilities of the Terre Haute Gravel Company are served by four main railroads, and production at the plant is expected to be continued without interruption.

Former officials of the company are Robert J. Connelly (president), Thomas J. Connelly (vice-president), Mrs. Alberta Connelly, their mother (treasurer), and E. L. Liffick (secretary). Standard Materials operates seven other sand-and-gravel plants in Indiana. Claude M. Herriman is president, and Alvin C. Johnson is secretary of the firm.

# Extra Oil, Sideways Operation Lengthen Transmission Bearing Life

● Track-type tractors frequently operate under conditions requiring special attention to the transmissions of the machines. When operating on extreme slopes, turning the tractor sideways or adding extra oil to the transmission will extend bearing life by supplying sufficient lubricant to the top shaft bearings.

TRACK-TYPE tractors are designed to work in all kinds of terrain and in adverse conditions. Their tracks allow them maximum traction and flotation in mud, sand, and other soft materials. The powerful diesel engines provide plenty of power to allow the tractors to traverse steep grades and rough terrain which are hard for a man to travel on foot. In addition, seals, guards, and other safeguards assure that the track-type tractor can operate under these adverse conditions safely without unnecessary wear and tear on its working parts.

Often, however, unusual operating conditions will require special attention to the transmissions of the machines. Slightly different operating procedures are also necessary to keep the tractors performing at their maximum capacity.

Many of the smaller track-type tractors are equipped with splash lubrication systems for the transmission and bevel gear compartment. When operating on extreme slopes, the top shaft bearings in a transmission do not receive as much lubricant as they would if operating on level ground, and bearing life may be shortened.

When the tractors are to be operated for extended periods of time under these conditions, extra oil should be added to the transmission to extend the bearing life. If extra lubricant is undesirable or is not immediately available, operators should maneuver the tractor sideways momentarily to increase the lubrication. Experience with many machines which literally "stand on end" on mountain sides indicates that such sidewise maneuvers performed every 500 to 1000 ft. measurably extend transmission bearing life.

Track-type tractors equipped with force-fed lubrication systems in the transmissions will also benefit from added transmission oil or sidewise maneuvers when they are operated down slopes for extended periods of time.

If more attention is given to tractors that must be operated under abnormal conditions, the operators will add considerably to the life of the tractor. This special care will shorten down time and minimize operating costs.

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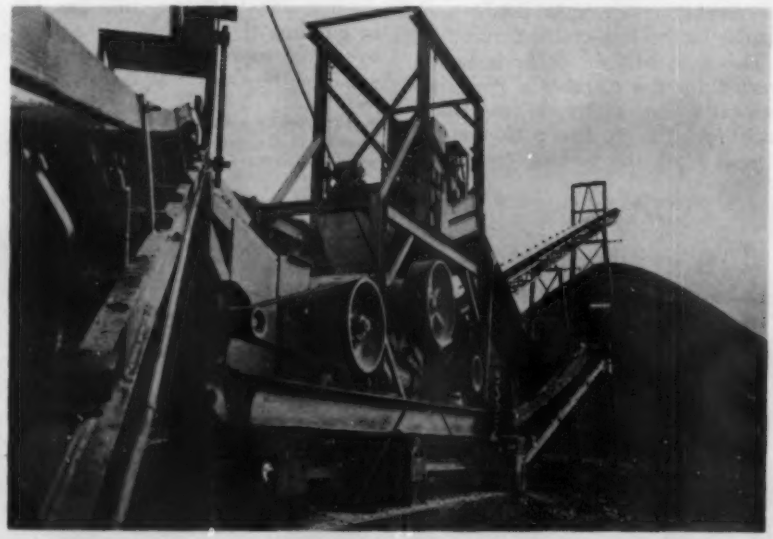
### California Plant Installed To Test Newly-Developed Unit

Set up late in 1954, primarily as a "proving ground" for the Waldrip Roto-Crusher, the plant of the Beeler Canyon Sand & Gravel Company near Escondido, Calif., is currently producing at the rate of 90 t.p.h.

William Sprague, president of Waldrip Engineering Company, Hollydale, Calif., developer of the Roto-Crusher, heads the Beeler Canyon operation. This firm to date has produced only unwashed crushed and sized material which is sold to contractors and other users. Later on washing facilities and additional screening capacity may be installed.

A slack-line cableway with a 2-cu. yd. bucket excavates and delivers the pit-run to the plant hopper, which supplies a Cedarapids 10- by 36-in. primary jaw crusher. Scalping and sizing is done on a Largo-type 42-in. by 80-in. vibrating screen. Secondary reduction, up to 50 t.p.h., is handled by the Waldrip Roto-Crusher equipped with dual cylindrical rolls having deeply-corrugated faces. The rolls are 32 in. in diameter and have 20-in. faces. Coated-Tube Stoodite was used to hard-face the rolls to prevent wear due to abrasion and impact. The Roto-Crusher is usually set at ⅝ in.

Crushed and blend-sized material goes to a 2,000-ton live-storage stockpile *via* a 24-in. by 150-ft. inclined belt conveyor. Recovery is by way of a 24-in. by 80-ft. tunnel belt which loads delivery trucks. Freeman Gates, sales engineer, manages the new plant.



Crushing and screening equipment in the Beeler Canyon Sand & Gravel Company's plant, with return and stockpiling conveyors in the background. The plant was set up mainly to prove the wear characteristics of a newly-developed roll crusher.

# Combined Metals Reduction Processing Perlite in Utah

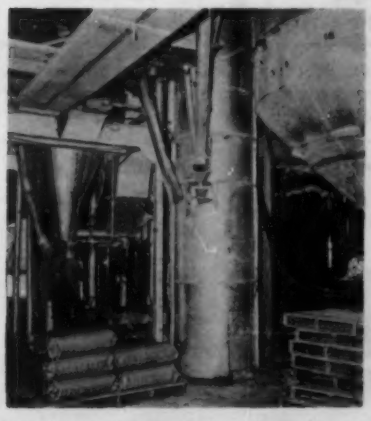
The propane tanks and the plant at the Combined Metals Reduction Company operation near Bauer, Utah.

PERLITE ore, mined and processed at Pioche, Nev., by the Combined Metals Reduction Company of Salt Lake City, is currently being expanded in a plant set up adjacent to this firm's lead-and-zinc operations at Bauer, Utah.

Careful wasting of most of the extreme fines during crushing and processing of the crude ore at Pioche before shipment has enabled the Bauer expanding plant to produce popped perlite (trade name Panacalite) without too large a volume of nuisance fines in the minus-100-mesh range, for which there is little market.

A propane-fired furnace, 24 in. inside diameter and 24 ft. high, is used to pop the product at Bauer, burners being arranged annularly below a venturi throat in the furnace near the bottom. Expansion occurs at about 1,000 to 1,100 deg. F. Air-classification is employed to size the finished product. A 48-in. Sweco separator in the circuit screens out any minus 80-mesh fines before the final material goes to the bagging bins. The popped perlite is packed into 4-cu. ft. bags by a volumetric packer. Capacity is about 400 cu. ft. per hour.

The company also supplies sized perlite ore to its expanding plant-affiliates in Los Angeles and Kansas City, shipment being made direct from Pioche.



This view in the Bauer plant shows the vertical furnace in which the perlite is expanded. Two of the feed spouts may be seen.

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Production from a new lime plant at Silverstreams, South Africa, has begun. Its owners expect it to develop into one of largest lime operations in the world.

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The Jefferson Lake Sulphur Company, with offices in New Orleans, La., received a first place safety award during the 16th Annual Texas Safety Association convention.

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The plant of the Mahomet Sand and Gravel Company at Urbana, Ill., was recently opened. The firm is a dredge operation using 5,000 g.p.m. of water and with a capacity of about 150 t.p.h.

## Five Cement Firms Report Record High Incomes And Sales During 1954

Net earnings of $1,179,533 and sales of $6,843,241 for 1954 were announced by the Keystone Portland Cement Company. Earnings during 1953 were $808,394 and sales amounted to $6,772,370.

A net income of $1,382,396 was earned by the Longhorn Portland Cement Company, as compared with $994,208 during 1953.

The Bessemer Limestone & Cement Company reported net earnings totaling $1,296,693 for last year; in 1953 earnings of $1,248,828 were reported.

Earnings of $3,018,840 on sales of $25,647,988 were netted by the Medusa Portland Cement Company during 1954. During the previous year the firm reported a net income of $1,859,735 on sales of $23,283,472.

Calaveras Cement Company officials reported a slightly lower net income in 1954, but somewhat higher sales. Income was $836,088 on sales of $8,668,491 in 1954. The year before net income totaled $950,649 on sales of $8,530,616.

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Sale of the Havre Sand and Gravel Company to the Baltrusch Construction Company, both of Havre, Mont., has been announced. The new owner will operate the newly-acquired firm under the same name.

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A fire in the hot mix plant at the Kaiser Gravel Company, Pleasanton, Calif., caused damage amounting to $10,000 to one of the buildings and equipment recently. The fire apparently started from a short circuit in an electric motor.

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Officials of Bessemer Limestone & Cement Company, Youngstown, Ohio, have announced that construction has started on a $3,600,000 expansion at the firm's Bessemer, Pa., plant to meet increased cement demand.

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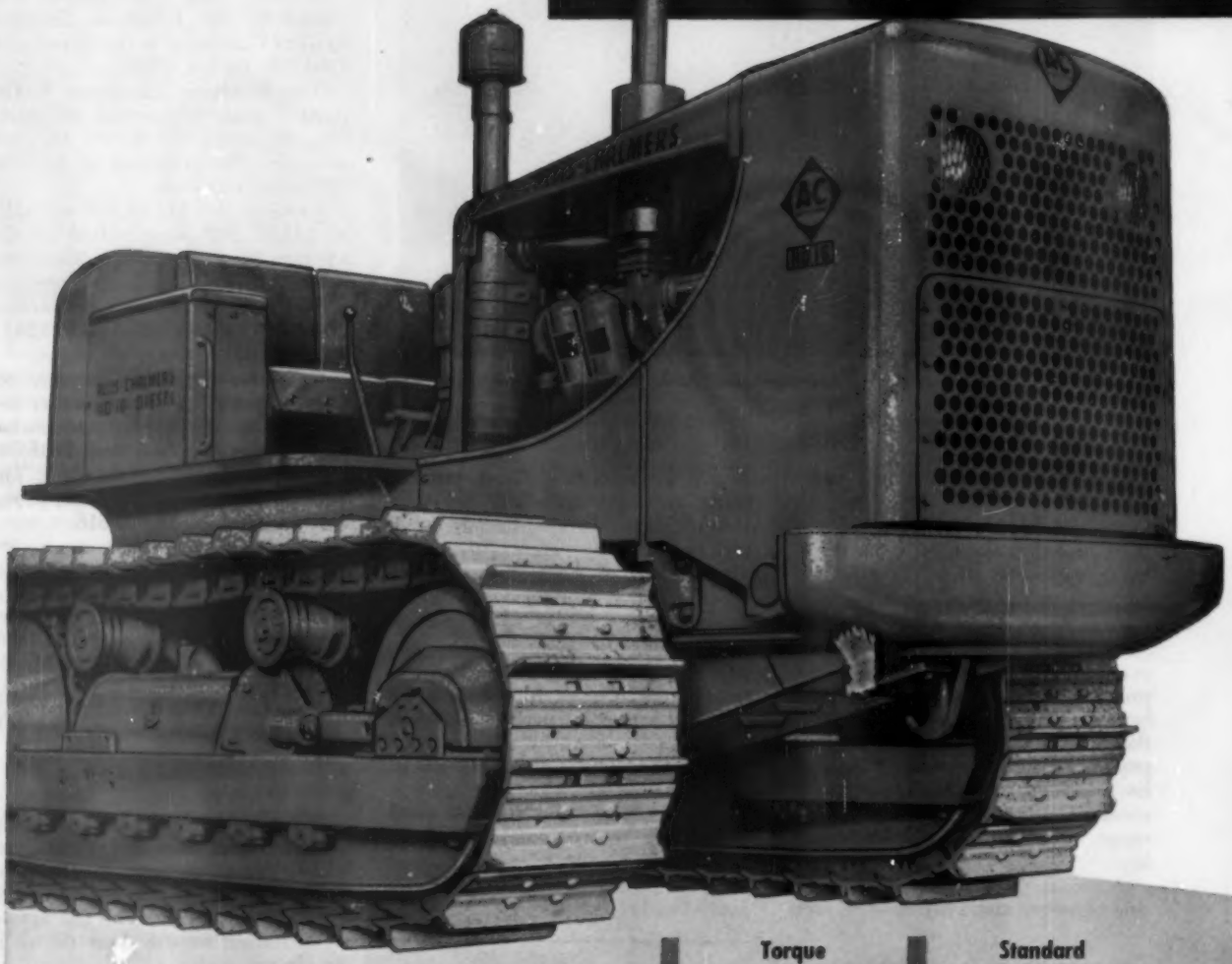
To provide for future expansion and a continued supply of high-grade limestone, officials of the United States Lime Products Corporation have purchased a 114-acre ranch adjacent to their present operating properties at Sonora, Calif.

# Allis-Chalmers presents the NEW HD-16



***Your choice of two outstanding drives***

| | Torque Converter Drive | Standard Transmission Drive |
|---|---|---|
| Horsepower | 150 net engine hp | 131 belt hp |
| Weight | 31,600 lb | 31,500 lb |
| Drawbar pull | up to 60,000 lb * | up to 35,945 lb * |

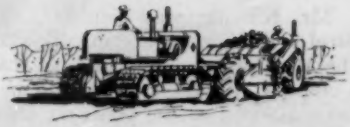
*Limited, under normal tractive conditions, to 90 percent of total weight of tractor and mounted equipment.

**ALLIS-CHALMERS**
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

# NEW STANDARDS OF PERFORMANCE

## for a wide range of heavy-duty work

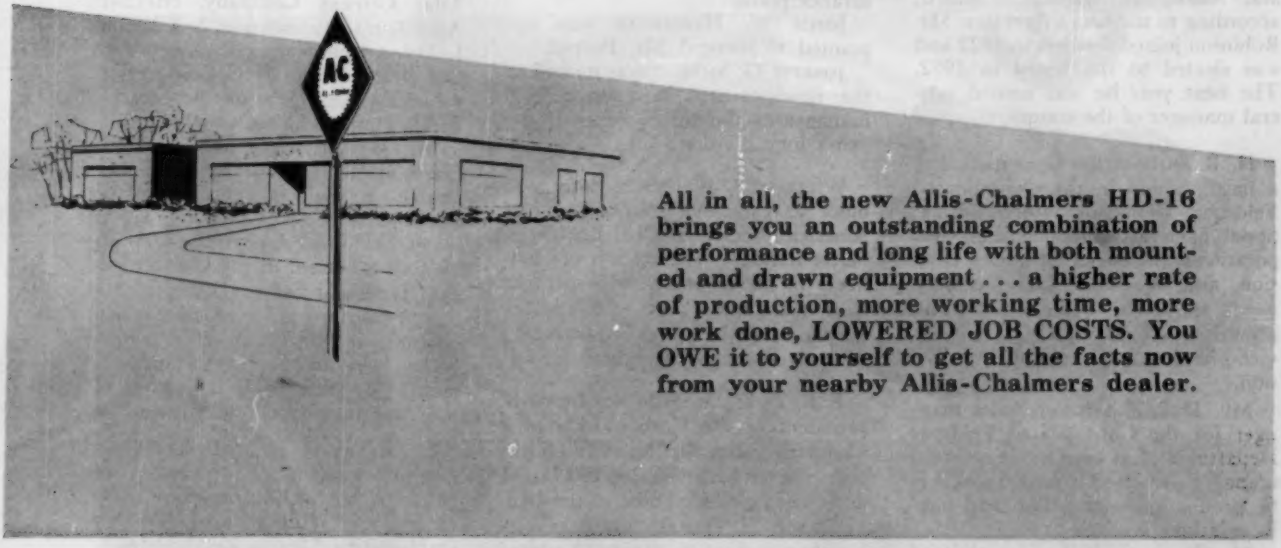
Set your sights on an HD-16! This big new tractor not only brings you *more* power for bigger jobs . . . it makes more effective use of horsepower, with a brand new Allis-Chalmers diesel engine and your choice of two new drives — the job-proved torque converter or the easy-shift standard transmission. Either way, the HD-16 brings you a new high in tractor-operator efficiency . . . a new high in work done under even the toughest conditions.



# NEW STANDARDS OF DEPENDABILITY AND LONG LIFE

## under *all* conditions!

The HD-16 follows the Allis-Chalmers *advanced basic design,* with such important features as its all-steel, Box-A main frame and one-piece steering clutch and final drive case . . . straddle-mounted final-drive gears with tapered roller bearings . . . unit construction . . . simplified lubrication and service designed with *better* maintenance in mind. What's more, it is newly engineered throughout to provide big safety factors in all components . . . plus outstanding new features like the new Allis-Chalmers heavy-duty diesel engine, new "wrap-around" radiator guard, husky new transmissions, new true-dimension track, and many others.




**All in all, the new Allis-Chalmers HD-16 brings you an outstanding combination of performance and long life with both mounted and drawn equipment . . . a higher rate of production, more working time, more work done, LOWERED JOB COSTS. You OWE it to yourself to get all the facts now from your nearby Allis-Chalmers dealer.**

Appointment of JOHN P. KINVILLE as vice-president of the Michigan Limestone Division of the United States Steel Corporation has been announced.

Mr. Kinville, who joined U. S. Steel in 1916 as an accountant with the Michigan Limestone & Chemical Company, Rogers City, Mich., has been assistant to the president since 1951.

E. J. HOLZ, Dubuque salesman for the Penn-Dixie Cement Corporation in northeastern Iowa for nearly 25 years, retired recently. He is succeeded by FLOYD J. MILLER, who joined the organization in 1954.

CARLETON J. LEWIS has been elected president and treasurer of the Buffalo Gravel Corporation, Buffalo, N.Y., succeeding EDGAR B. MALONEY, who has resigned.

HARRY T. HAWKINS, who had been sales manager, has been elected vice-president in charge of sales of the firm, and WILLIAM I. MOREY, attorney, was named secretary.

J. H. ROBINSON has been appointed vice-president of Gypsum, Lime and Alabastine, Canada, Limited, according to the firm's directors. Mr. Robinson joined the firm in 1922 and was elected to the board in 1952. The next year he was named general manager of the company.

H. B. DUBOIS has been named to a new position in the Consolidated Feldspar Department of International Minerals and Chemical Corporation's Industrial Minerals Division, and W. K. BURRIS has been newly appointed to the department, according to Norman J. Dunbeck, vice-president in charge of that division.

Mr. DuBois, formerly sales manager for the Consolidated Feldspar Department, has been made assistant manager. Among his new duties will be production-sales liaison and public relations services.

Mr. Burriss joins the Consolidated Feldspar Department as sales manager. He formerly was associated with Industrial Publications. Both Mr. DuBois and Mr. Burriss will make their headquarters at Erwin,

Several changes have been noted in various departments of the Warner Company in recent weeks.

FRANK R. CADMAN has been elected vice-president in charge of industrial relations for the firm. Mr. Cadman will continue to supervise employee communications, safety, and personnel problems, and in addition, will have full responsibility for labor relations and union contracts.

LEA P. WARNER JR. has been appointed director of safety, with responsibility for the company's safety program. Mr. Warner was at one time personnel manager of the firm. He recently served as chairman of the Cement and Quarry Section of the National Safety Council.

CALVIN PURNELL, formerly personnel manager of the Bellefonte Division of the Warner Company, has been transferred to Philadelphia as manager of employee relations, with responsibility for labor and employee relations, and welfare and insurance plans.

JOHN W. HASSINGER was appointed to succeed Mr. Purnell.

JOSEPH O. SHEROD was named to the newly-created post of general manager of the three plants of the firm's lime division.

WILLIAM H. WISELY recently took office as executive secretary of the American Society of Civil Engineers, oldest national organization of engineers in the country. He succeeds Col. William N. Carey, who held the post for ten years and is retiring as executive secretary-emeritus.

F. B. THACHER, who was formerly president of the Carbon Limestone Company, Lowellville, Ohio, has been elected chairman of the board and chief executive officer of the firm.

GEORGE H. DONALDSON, previously vice-president in charge of operations, was named president. The two promotions were made at a recent meeting of the board of directors.

EVERETT E. KNOTT has been named general manager of all Texas Industries plants in the Dallas area and in Oklahoma, Ralph B. Rogers, president, has announced.

Mr. Knott has been general manager of the Texcrete Company and Tex-Tile, Inc., Dallas. His new duties will include, in addition, responsibility for operations at the Dallas Lightweight Aggregate Company, the Oklahoma Lightweight Aggregate Company, Oklahoma City, and the Texas Lightweight Aggregate Company, Eastland. Before joining Texas Industries in 1951, Mr. Knott was with the Lone Star Cement Company as assistant sales manager of the Texas division, and as sales manager for the Indiana division.

CYRUS J. TAYLOR, manager of National Gypsum Company's Bronx, N. Y., plant for the last 13 years, recently retired from this post, according to an announcement released by Melvin H. Baker, chairman of the board.

At the same time it was announced that RICHARD G. TARBELL, formerly plant manager at the firm's Fort Dodge, Iowa, plant, will succeed Mr. Taylor as manager at the Bronx facilities.

Mr. Taylor joined National Gypsum in 1936 at its Portsmouth, N. H., operation. Mr. Tarbell has been with the company since 1939, and served at the Savannah, Ga., Baltimore, Md., and Fort Dodge plants.

ROBERT G. WATSON has been appointed technical service manager at the New York office of the Universal Atlas Cement Company, effective April 1, it was announced by Clayton L. Davis, technical service director of this United States Steel Corporation subsidiary. Mr. Watson succeeds G. E. Elsenhans, who has resigned.

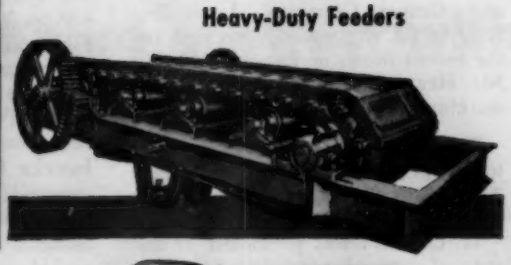
Mr. Watson was graduated from Clemson (S.C.) College with a B.S. degree in civil engineering. After three years of service in the U. S. Navy he joined Universal Atlas in 1946 as a trainee in the Chicago office Technical Service Bureau. He was advanced to technical service engineer in 1947, a position which he has held until his present appointment. Mr. Watson is a member of the American Concrete Institute.

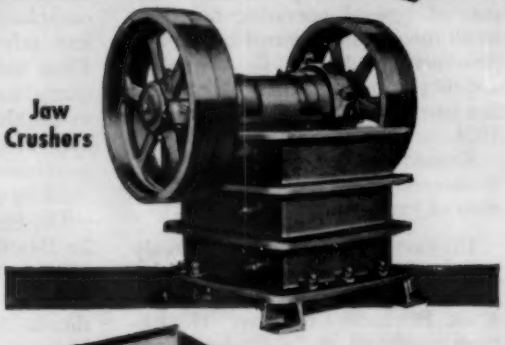
E. AVERY WILLIAMS has been named manager of operations of North American Refractories Company. Mr. Williams was formerly employed by Mexico Refractories.

# TELSMITH

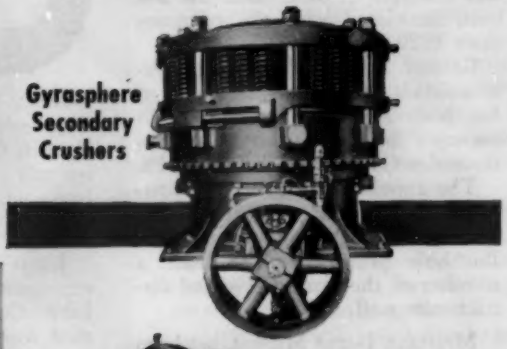
feeding
coarse crushing
screening
fine crushing
scrubbing

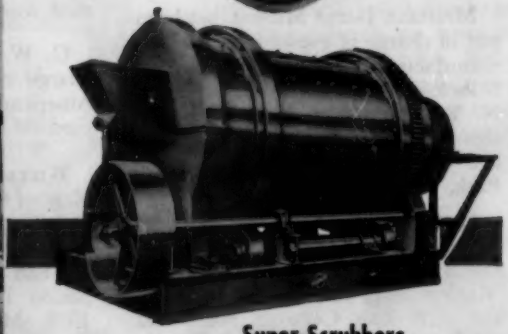
# EQUIPMENT
## FOR AGGREGATE


Heavy-Duty Feeders


Jaw Crushers

Vibrating Screens


Gyrasphere Secondary Crushers


Super-Scrubbers

E-16

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CHESTER P. HEGAN has been elected president of the Ohio River Sand and Gravel Company, Louisville, Ky., to fill the vacancy created by the recent death of James T. Duffy. Mr. Hegan had been vice-president, secretary, and general manager.

Two appointments at the Buffington, Ind., plant of the Universal Atlas Cement Company were announced recently:

C. C. RING was promoted to the post of general operating foreman, to fill the vacancy created by the appointment of Sidney C. Englin to assistant plant manager. Mr. Ring has been with Universal Atlas since 1924.

ROBERT C. SCHMIELAN was named to succeed Mr. Ring as general foreman of yard and transportation.

HOWARD STOERCK was recently appointed Orange County, Mich., superintendent of the Consolidated Rock Products Company. He has been employed at the Orange plant for 14 years. He will have supervision of the plants in Orange and Yorba Linda.

RICHARD S. MOORE has been appointed general sales manager of Harbison-Walker Refractories Company, effective May 1. Mr. Moore had been assistant general sales manager since 1953 and prior to that was manager of basic sales. He has been associated with the company since 1929.

GEORGE S. MCLAUGHLIN, formerly assistant general credit manager, has been appointed general credit manager by Harbison-Walker Refractories Company, Pittsburgh, Pa.

The appointment of R. A. BUCHHOLZ as Pittsburgh district sales manager was also announced. Mr. Buchholz previously had been a member of the firm's Cleveland district sales staff.

MICHAEL JAMES MESSEL has been put in charge of gypsum mining and manufacturing operations for the Ruberoid Company, New York, N. Y. In addition to this new assignment, he will continue to manage the asbestos mine at Hyde Park, Vt.

CHARLES A. SMITH, vice-president in charge of engineering for the Mexico Refractories Company, Mexico, Mo., was made a fellow of the American Ceramic Society at this organization's 57th annual meeting, held in Cincinnati, Ohio, in April. The award was in recognition of outstanding achievements and contributions in ceramic science and technology.

### Dr. R. H. Flinn Named Chief Of Mines Bureau Division

Appointment of Dr. Robert H. Flinn as chief of the Division of Health of the Bureau of Mines, on a two-year detail from the United States Public Health Service has been announced by Secretary of the Interior Douglas McKay. Dr. Flinn assumed his new duties on May 2.

The Division of Health was established last December as part of a reorganization of the Bureau's health and safety activities. As chief, Dr. Flinn will assist in formulating programs and basic policies with regard to health in the mineral industries and in directing research designed to minimize health hazards peculiar to those industries.

Dr. Flinn has been with the Public Health Service since 1931. From 1936 to 1942, while stationed at the National Institutes of Health, Bethesda, Md., he conducted a series of field investigations. Dr. Flinn also worked with the Maryland State Health Department to develop an industrial hygiene program.

### Chemists Issue 15th Edition Of "Consulting Services"

The 15th edition of *Consulting Services* (1955), published by the Association of Consulting Chemists and Chemical Engineers, Inc., is off the press. Revised and streamlined, it contains 144 pages.

The volume is divided into three sections—the Classifier, Scope Pages, and the Index. The Classifier contains over 200 items of activity and lists members in given fields; Scope Pages describe members' qualifications and activities; and the Index lists members alphabetically and geographically.

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A conference on dust control will be held by member companies of the National Industrial Sand Association at the Mellon Institute, Pittsburgh, Pa., on June 16. The meeting is being held under the joint auspices of the association and the Industrial Hygiene Foundation.

## obituaries

RILEY BURKE, a midwestern traveling salesman for the Lone Star Cement Company for 30 years, died recently at the age of 73. He retired from active service with Lone Star in 1953.

JOHN H. CRAIGMIRE, 91, former superintendent of the Marblehead Lime Company at Sarcoxia, Mo., died recently in a local hospital.

G. W. WARNIC, vice-president in charge of operations of the North American Refractories Company, died on March 24.

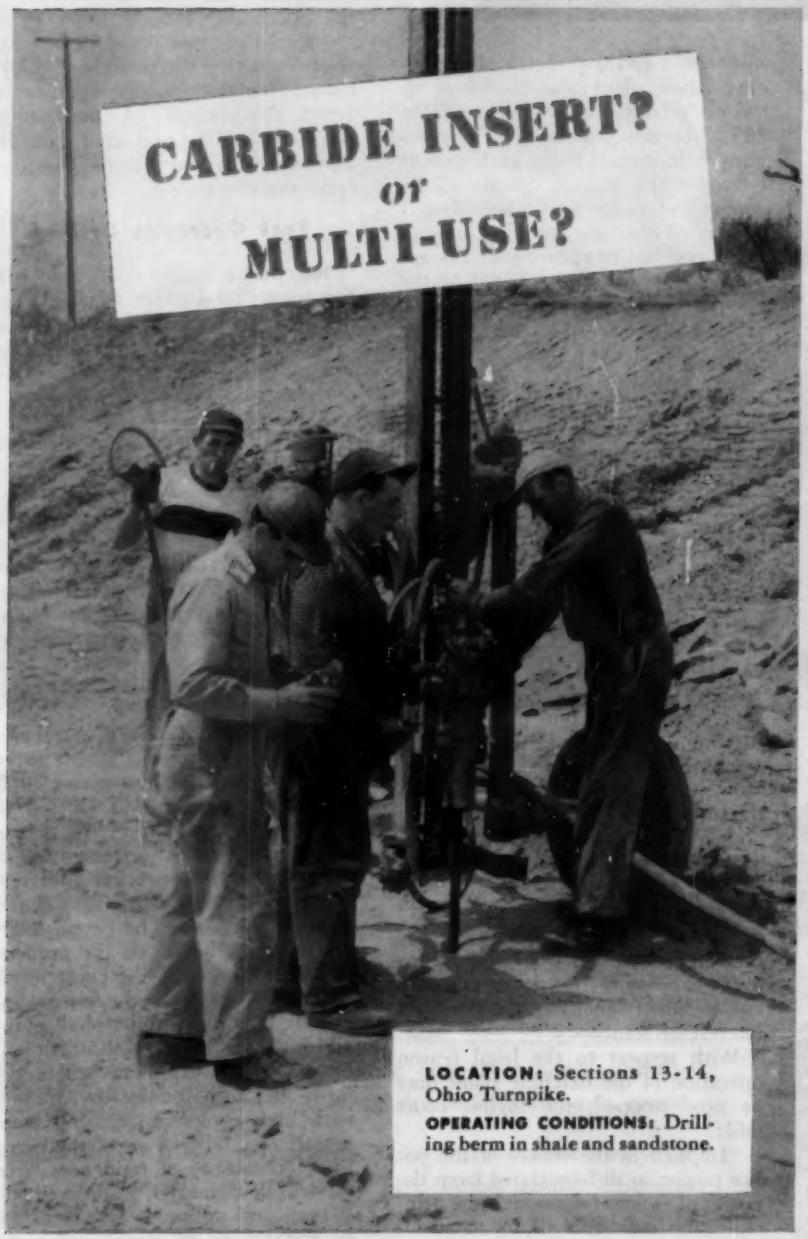
WILLIAM N. BEACH, a retired president of the Penn-Dixie Cement Corporation, died on May 5 at his home in Great Neck, Long Island, N. Y. He had retired from active participation in the cement business in 1926. Mr. Beach was 82 years old.

TIMOTHY J. QUINN, 83, who was for many years superintendent of the dolomite quarries of the Colorado Fuel & Iron Corporation, Denver, Colo., died recently in Pueblo, Colo. Mr. Quinn had worked for the firm from 1892 until his retirement in 1947.

CAPTAIN SAMUEL THORNTON GINNETT, 82, died recently in a hospital in Bellingham, Wash., after a protracted illness. As one of the founders of the Whidbey Island Sand and Gravel Company, with headquarters in Bellingham, Captain Ginnett was master of the firm's tug, the *Famous*. (Whidbey Island Sand and Gravel Co. was later merged with the Bellingham Builders Supply Company.) He was a master mariner and one of the best known captains on Puget Sound, having been in recent years associated with the Bellingham Tug & Barge Company.

FRED B. GILLE, who was formerly a part owner of the Kaw Valley Sand Company, Kansas City, Mo., died recently in a hospital in Orange, Calif. After terminating his association with this firm, he moved to California in 1948. He was 63 years old.

# Western Contractors Corp. cuts drilling costs on $10 Million turnpike contract with TIMKEN® multi-use bits




**LOCATION:** Sections 13-14, Ohio Turnpike.

**OPERATING CONDITIONS:** Drilling berm in shale and sandstone.

SECTIONS 13 and 14 of the Ohio Turnpike, in the vicinity of Hudson, is being worked by Western Contracting Corp., of Sioux City, Iowa. At one highway intersection there are about 1,000,000 cubic yards of rock to excavate from an open cut 80 to 90 feet deep. For drilling berm they are using two wagon drills; two more will be added later.

Since the ground is shale and sandstone, Western Contracting found Timken® *multi-use* bits the most economical. Drilling speed and bit life are high. Timken multi-use bits are usually cost-cutters in ordinary ground, when full increments of steel can be drilled—with correct and controlled reconditioning, of course!

But for hard and abrasive ground, for exceptionally deep holes, small-diameter blast holes and constant-gauge holes, Timken carbide insert bits are usually most economical. Their longer life more than compensates for their higher cost.

*Both* types of Timken bits, in dozens of different sizes, fit the same steel. This means that, if the ground changes, you easily and quickly switch to the type of bit that is most economical. No need to lose time hunting up different steels.

All Timken bits are made from electric furnace Timken fine alloy steel, and have the shoulder union that is designed to keep drilling impact from damaging threads.

It will be worth your while to get our recommendation on what bit to use for your present job. Write: The Timken Rock Bit Engineering Service, The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

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Timken threaded multi-use rock bit

Timken threaded carbide insert rock bit

# Legal decisions

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

## Zoning Ordinances

Since the subject of zoning ordinances is of great importance, I shall review the law on this subject, as established by late and leading higher courts.

A legal question presented by numerous readers is whether a new ordinance may curtail or stop operation of plant fully in operation at the time the new ordinance was enacted. Recently a higher court considered this important question.

For illustration in *Livingston Rock & Gravel Company,* 272 Pac. (2d) 4, it was shown that a company erected on its property a batching plant for the loading of ready-mix concrete mixer trucks with concrete aggregates. The plant was erected pursuant to a building permit issued by the county building department and the company complied with all the smog control and air pollution ordinances of the county. Also, the company secured a permit authorizing the operation of the plant. The plant cost $18,000 to build, and $80,000 worth of mixer trucks were purchased. Sometime after the plant was in operation the county adopted a new zoning ordinance rezoning the area into an M-1 zone (light manufacturing), which prohibited construction and operation of new batching plants in this area. However, the company was allowed, by the new zoning ordinance, 20 years in which to operate its plant in order to give it opportunity to realize sufficient profits to salvage its investment. This is known as "automatic exception" of the company's batching plant to enforcement of the new ordinance, and such an exception was held valid by the higher court.

Now, after the company's plant was in operation only a short period of time the planning commission notified the company that "use of the property with a cement batching plant thereon" was "being exercised in such a manner as to be detrimental to public health, and so as to be a nuisance"; and that their right to operate their plant was therefore revoked "effective as of January 31st, 1952," or one year later. The company in its appeal to the higher court conceded the general validity of the zoning ordinance as a whole, but it contended that the rezoning amendment may not be constitutionally applied to require the removal of the company's existing business from the rezoning district. In other words, the company's counsel maintained that the unlimited right to operate the company's cement batching plant in the area, (a lawful use of the property as originally zoned) could not be curtailed or limited by subsequent rezoning without violating the constitutional guarantee of due process of law.

Notwithstanding these arguments, introduced and presented by the company's counsel, the higher court held:

"Protection of an undertaking involving the investment of capital is akin to the protection of a nonconforming use existing at the time that rezoning conditions become effective. However, zoning legislation looks to the future in regulating district development and the eventual liquidation of nonconforming uses within a prescribed period commensurate with the investment involved. The mere fact that some hardship may thereby be experienced is not controlling, for every exercise of the police power is apt to affect adversely the property interest of somebody."

With respect to the legal reason operation of the batching plant may be now stopped, the higher court said:

"Implicit in the theory of the police power, as differentiated from the power of eminent domain, is the principle that incidental injury to an individual will not prevent its operation, once it is shown to be exercised for proper purposes of public health, safety, morals, and general welfare, and there is no arbitrary and unreasonable application in the particular case. Revocation of the right to continue a previously existing lawful business because of such finding would be a legitimate exercise of the police power."

Hence, in this late case the higher court clearly held that under police powers a state, county, or city may stop operation of a plant which is presently detrimental to the public health or safety, although such plant was in operation before a new zoning ordinance was enacted prohibiting the operation. On the other hand, the legal questions remain to be answered whether the plant may be operated if new methods eliminate its being detrimental to the public health and safety, and what damages may be recovered by the company from the county.

## Rock Quarrying Defined

Recently a higher court held that the term "sub-surface mining" does not include rock quarrying. Therefore, zoning and other similar laws using this term have no legal effect on quarry operations.

For example, in *Orsinger* v. *Olmos Rock Products,* 269 S. W. (2d) 561, a state law was litigated which provides that no injunction or temporary restraining order shall ever be issued prohibiting "sub-surface drilling or mining" operations unless the testimony proves that the operator is not financially responsible or unable to respond in damages to nearby property owners for such injury as may result from such drilling or mining operations.

Olmos Rock Products purchased certain lands with the intent to establish a rock quarry and asphalt plant. The quarry was located on property near a "number of permanent homes," and the entire area, although not then being used for residence purposes, had been purchased for that purpose. The people planning to erect homes on the property filed suit and asked the court to enjoin Olmos Rock Products from operating the quarry and asphalt plant, alleging that the establishment and operation of the quarry will necessarily be accompanied by blasting with high explosives, causing noise, vibrations, and tremors of the earth; that foundations of residences "likely" will be damaged, water wells destroyed and polluted; that lives will be endangered by stones and rocks; that the operations will require heavy machinery, trucks, and much labor; that the pulverized limestone will result in dust; that the operation of the plant will result in the pollution of the air by fumes and heated oil; and that it is impossible to operate the plant without causing such annoyances, discomforts, and damages.

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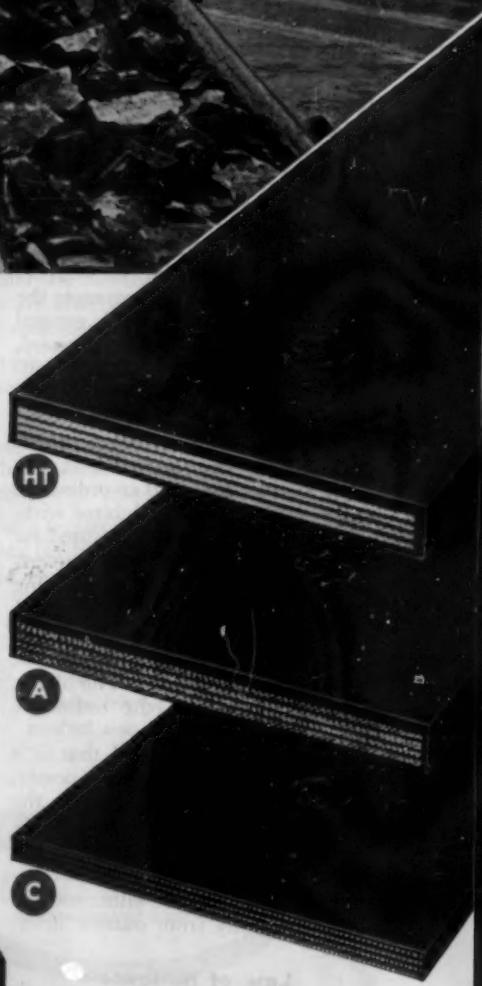


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The counsel for Olmos Rock Products contended that the suit could not be maintained, in view of the above mentioned state law, because the Olmos Rock Products is fully financially responsible and able to pay to these complaining nearby home and property owners any and all damages resulting from operation of the quarry and plant. The higher court refused to agree, and said:

"The question is not whether the term 'mining' includes 'quarrying' but whether 'sub-surface mining' includes 'quarrying.' The Legislature in using the word 'sub-surface' sought to distinguish surface operation from sub-surface operations. A quarry is an open-cut method rather than an underground or, synonymously, a sub-surface method. We cannot disregard the legislative use of the word, especially when its use is in complete harmony with mining classifications. Whether the things complained against will necessarily occur, and if so, whether under the circumstances they will result in a nuisance, we cannot know until the appelants (property owners) have been afforded an opportunity to present evidence."

### Unreasonable Ordinance

Considerable discussion has arisen from time to time over the legal question: When is a zoning ordinance valid? According to a leading higher court the authority of a city to impose limitations upon the use of private property rests upon two sources: first, the police power to promote the safety, health, morals and general welfare of a community; and, second, the zoning provisions in the state constitution.

For illustration, in *Duffcon Concrete Products, Inc.* v. *Borough of Cresskill,* 58 Atl. (2d) 104, it was shown that a city passed an ordinance which restricted and prohibited within the city any buiding to be used for fabricating, manufacturing, converting, altering, finishing, or assembling where mechanical power exceeding 1 hp. electric motor is used. The Duffcon Concrete Products contested the validity of the ordinance. The higher court promptly held the ordinance void, saying:

"We do not understand that it is within the reach of the police power, either inherent or as enlarged by the constitutional zoning provision, for a municipality to restrict the use of private property to the end that a community may be isolated either socially or commercially from outside intercourse."

### Law of Nuisance

Irrespective of zoning ordinances circumstances may exist under which a court will grant an injunction to prevent conduction and operation of what is known as a legal nuisance. Also, damages may be allowable.

The various courts have held that the present inconvenience, annoyance, and discomfort to the occupant of real property, caused by the maintenance of a temporary nuisance in the immediate vicinity, is a separate and distinct element of damage from that of the depreciation of the usable or rental value of the property. And again the damages resulting from any and all expenditures incurred by the property owner, resulting from the nuisance, is another and separate cause of legal action or suit, whether the nuisance is temporary or permanent.

In *Oklahoma City* v. *Eylar,* 177 Okl. 616, the court said:

"The personal inconvenience, annoyance, and discomfort to the occupant of real estate caused by the maintenance by another of a temporary nuisance in the immediate vicinity of said real estate is a separate and distinct element of damage from that of the depreciation of the usable or rental value of the real estate occupied; the measure of such damages being reasonable compensation for the injury."

It is well established law that the higher courts will abate a legal nuisance although it has been in existence for many years. Also, the court will award damages to nearby property owners whose comfort, health and welfare has been "greatly impaired".

For example, *Davis* v. *Pal Quarries Company,* 48 S. E. (2) 329, the testimony showed facts, as follows: A quarry company had for many years operated a stone quarry. Just recently owners of property in vicinity of the quarry filed suit and asked the courts to award them damages and compel the quarry company to stop operating its quarry as a "nuisance".

The property owners alleged that the quarry company and "its employes have negligently, carelessly, recklessly, wantonly and wilfully managed, supervised, maintained, controlled, used and operated the quarry in such a manner as to cause and still cause vibration of the earth to take place, and stone, dirt, dust and other substances to be thrown on their premises, and great noises to continue at frequent intervals, and has maintained a nuisance".

The higher courts listened to the testimony and held that if a jury decides that these acts of the quarry company constituted a legal "nuisance", the property owners are entitled to recover damages and the quarry company must abate the nuisance, although the property owners delayed many years in filing the suit.

For comparison, see *East Company* v. *James,* 199 S. W. (2d) 589. Here it was shown that a company had operated a rock crusher at the same location for many years. Recently the company started all-night work. Witnesses testified that during the night the noise of the crusher was very disturbing, that trucks were used most of the time, that headlights from trucks flashed through windows, and that the entire district was brilliantly illuminated to facilitate work. The effect was that many of the residents were unable to gain sleep until exhaustion aided them.

The lower court granted an injunction to stop operation of the rock crusher between 7 p.m. and 7 a.m. The higher court approved the verdict and said:

"If it be conceded that the area was more suitable to industrial use than residential occupancy, the fact remains that erection of some of the homes was prior to crusher work on a continuous schedule—even before the crusher was put on the property —and certainly before its management inaugurated a 24-hour, seven-day week program. . . . In view of the evidence, we are not able to say that the lower court erred in directing that operations be discontinued from seven o'clock in the evening until seven o'clock a.m."

For comparison see *Jones* v. *Kelley Trust Company,* 179 Ark. 857. The testimony showed facts, as follows: A rock crusher had been used in the vicinity for many years. A new noisy crusher, materially different from the old rock crusher, was installed.

In holding that the new crusher could not be operated with more annoyance than the old machinery, the higher court said: "The cases hold that the rights of habitation are superior to the rights of trade and, whenever they conflict, the rights of trade must yield to the primary or natural right."

For variations of the law pertaining to operations of rock crushing and like machinery, see *Bristol* v. *Palmer,* 83 Vt. 54; and 20 R.C.L. 480, *American Jurisprudence,* c. 39 pp. 333, 334; *Corpus Juris,* v. 46, p. 670.

### Equipment Is Taxable

An important legal question is: When and under what circumstances

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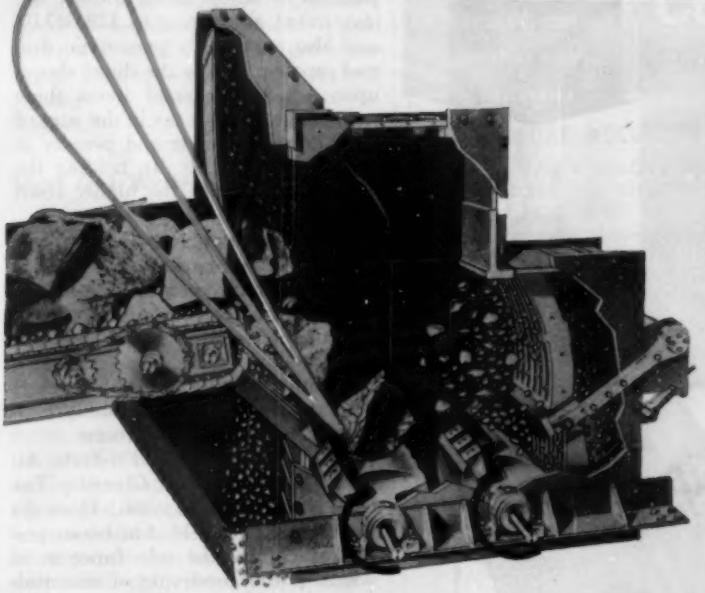

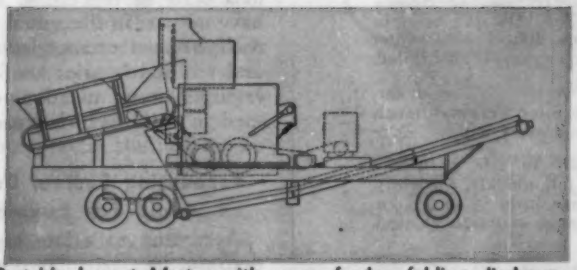

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is equipment exempt from a state's sales tax when used for manufacturing purposes? According to a late higher court decision mining and crushing rock is not a "manufacturing" process.

For example, in *Tulsa Machinery Company* v. *Oklahoma Tax Commission,* 253 Pac. (2d) 1067, the testimony showed facts, as follows: A state law provides that machinery and equipment purchased and used by persons establishing new manufacturing or processing plants, and machinery and equipment purchased and used by persons in the operation of manufacturing plants already established in the state are exempt from the State's Sales tax.

The evidence shows that the Anchor Stone and Material Company owned tracts of land beneath the surface of which lay a stratum of limestone rock. The first step in the process of the business was to remove the overburden of surface soil of the rock. This is done by use of bulldozers and shovels powered by motor equipment. After the removal of the overburden, the next step required the drilling of holes in the rock of sufficient size and depth as to emplant therein nitroglycerin or other explosives. The explosion would crack the rock into chunks, then by means of motor powered shovels and conveyors the rocks were loaded on a dump truck and transported to rock crushers located on the property of the company. The rock would then be placed in and would pass through a series of crushers. The crushers would reduce it into small sizes for commercial use. The processed material was then sold and used for building roads, sidewalks and other purposes.

It was the contention of the Anchor Stone and Material Company that the equipment used in manufacturing the rock products were exempt from taxation, in view of the above mentioned state law.

The higher court refused to agree with this contention.

The items upon which the taxes were assessed consisted of the sale to Anchor Stone and Material Company of a K360 diesel shovel, the investment amounting to $28,687.02 and also parts for a pneumatic drill and repair parts for the diesel shovel upon which combined items there was assessed a sales tax in the sum of $645.72 plus interest and penalty in the sum of $173.89. In holding the equipment taxable, the higher court said:

"The machinery, repair parts, and equipment were not incorporated into and directly used in the manufacturing of property and for such reason the sales were not exempt from the tax."

In other words, this court clearly held that mining and crushing rock is not a manufacturing process.

For comparison, see *Tri-State Asphalt Corporation* v. *Glander,* Tax Com'r 90 N. E. (2d) 366. Here the Supreme Court held that boom and bucket cranes, the sole function of which is the conveying of materials to a place of processing, and which have no part in the actual processing itself, are not exempt from taxation under a state's sales tax law which exempts from taxation equipment used in manufacturing processes.

### Accounting System Does Not Avoid Tax Payments

According to a late higher court decision, no particular system of accounting can avoid payment of taxes levied under valid laws. In other words, if a company earns profits it must pay valid taxes, notwithstanding its accounting system to the contrary.

For example, in *Crane* v. *Carson,* 234, S. W. (2d) 644, the testimony showed facts, as follows: One Crane sued the State of Tennessee to re-

*Another actual field report*—Helena Sand & Gravel Co., of Helena, Montana, switched to this Sauerman equipment in 1946. It's been in operation since then . . . successfully performing difficult underwater excavation of rock and colloidal sand where other equipment had failed.

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cover alleged overpayment of franchise and excise taxes amounting to $35,951.92, The testimony showed that Crane is engaged both in manufacturing and selling in Tennessee. However, his principal place of business is Illinois. In addition to the retail outlets in Tennessee, Crane has sales branches in other cities throughout this country. Crane's accounting system attributed no net income to its Tennessee operations.

Nevertheless, the Tennessee State's Tax Commission decided that the system of accounting failed to take into consideration the fact that manufacturing losses were more than offset by retail sales profits. The higher court agreed with the Commission and refused to hold in favor of Crane, saying:

"Accounting practices for income statements may vary considerably according to the problem at hand. A particular accounting system, though useful or necessary as a business aid, may not fit the different requirements when a state seeks to tax values created by business within its borders."

### Must Get Written Authorization

A late higher court decision held that a contractor cannot recover payment for "extra" work he performed upon verbal authorization, when his written contract states that written authorization must be obtained.

For example, in *Bares* v. *City of Portola*, 269 Pac. (2d) 139, it was shown that a contractor, named Bares, was the successful bidder for the job of constructing certain sewerage system improvements for a city. Plans and specifications had been prepared and furnished to Bares, and other prospective bidders, when bids were solicited by the city. Upon the acceptance of Bares' bid a written contract was signed by the contractor and city. This contract contained a clause: "No extra work shall be performed or change made except upon a written order from the engineer and no claim for an addition to the contract sum shall be valid unless so ordered."

The contractor sued the city for several thousand dollars "extra" payments because (1) he was required verbally by the city engineer to backfill and relocate a ditch because a water line was incorrectly shown in the plans; (2) he was required verbally by the city engineer to do additional work not indicated in the plans; and (3) he encountered unexpected difficulties in installing manholes, owning to interference from other lines which were incorrectly shown in the plans.

However, the testimony showed that the contractor did not obtain from the engineer wirtten authorization to perform the extra work. Hence, the higher court refused to hold the city liable for any extra payments to the contractor, because of the above mentioned contract clause, and said:

"At no time was there a written order made by the engineer stating that extra work or change be made and by such written order authorized. If appellant (Bares) intended to seek compensation for any extra work or change, he should have proceeded to get the necessary authorization in accordance with the provisions of the contract."

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Barton W. Druckenmiller, president of Penn-Dixie Cement Corporation, recently told a meeting of Penn-Dixie stockholders that the firm paid $8,750,000 to purchase the Federal Portland Cement Company, Buffalo, N. Y. He said that arrangements with banks had been made to borrow $8,000,000. The sale price for Federal does not include the amount to be paid for the inventory.


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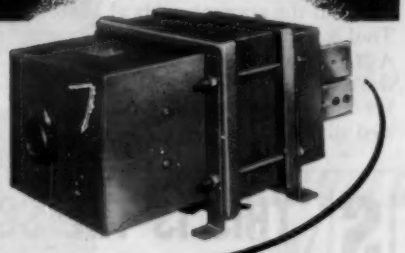
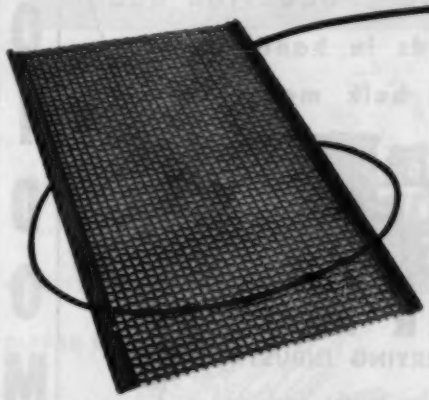


**FASTER, MORE ACCURATE SIZING**

HANCO electric heaters are engineered to meet top capacity requirements for heating **all** metallic screen cloth. Mechanical abuse such as "beating" or brushing can be **eliminated completely** when you install a HANCO electric heater. Treat your screens the modern way – get HANCO.



Available in five different assemblies. HANCO engineers have designed and constructed electrical screen heaters to fit YOUR make of screen. Note: Reduction in openings can be effected to meet ever changing specifications.

**LOOK AT THESE FEATURES**

Faster screening—faster processing means fewer "returns".

Elimination of mechanical abuse to keep screens open.

Longer screen life — no manual cleaning increases screen life up to 800%.

Fewer shut downs for replacement of worn screens.

HANCO quick change assemblies assure easy cloth changes.

Low maintenance cost. HANCO heaters are designed for heavy-duty service.

Hanco

**SEND FOR OUR COMPLETE BULLETIN**

**F. R. HANNON & SONS**

*1605 Waynesburg Rd. S.E., Canton 7, Ohio*

**PIONEERS IN ELECTRIC SCREEN HEATING – FIRST IN THE FIELD OF LOW VOLTAGE AND HIGH AMPERAGE SCREEN HEATING**

# trade notes

Joy Manufacturing Co., Pittsburgh, Pa., has appointed Equipment & Supplies, Inc., 540 Delwar Rd., Pittsburgh, as distributor for southwestern Pennsylvania, and parts of New York, Ohio, West Virginia and Maryland.

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Heat and Power Co., Inc., New York, N. Y., have moved their offices to the Lincoln Bldg., 60 East 42nd St., New York 17, N. Y.

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Carboloy Dept. of General Electric Co., Detroit, Mich., has announced the appointments of McKee Tool & Supply Co., 925 N. Jameson Ave., Lima, Ohio, and Harris Hardware & Supply Co., Inc., 660 Market St., Kingston, Pa., as authorized distributors.

A. E. Hohman, advertising manager of Blaw-Knox Co., Pittsburgh, Pa., since 1944, has been appointed coordinator of special sales activities. He will serve the sales department in the evaluation of advertising, sales promotion and special marketing activities.

Paul F. Vollmer, assistant advertising manager since 1949, has been appointed advertising manager, to succeed Mr. Hohman.

---

John W. Tucker has joined the field sales staff of Cummins Engine Co., Inc., Columbus, Ind., as a regional representative, with headquarters in Los Angeles, Calif. He succeeds J. P. Jung, who is now the regional manager for the southeastern region with headquarters in Atlanta, Ga.

Wm. E. Robinson of 350 Central Ave., Mountainside, N. J., has recently gone into business for himself as a consulting application and sales engineer of bulk materials handling, materials treating and ore benification equipment and installations. His prime activity will be that of application engineer, assisting industry solve their bulk transportation and benification problems, the correct application of conveyors, elevators, classifiers, dryers, screens, etc., covering the complete range from a single item of equipment to a complete plant or process.

Mr. Robinson is doing business as Wm. E. Robinson & Co., operating his office from his home in Mountainside. The company has been appointed sales engineers for the W. Richard Witte & Co., of Linden, N. J. Sales agreements with several other materials handling and benification equipment manufacturers are in the process of being completed.

---

Harold H. Heinecke, formerly assistant manager, has been appointed manager of the commercial research department of Allis-Chalmers Mfg. Co., Milwaukee, Wis.

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The appointment of Julius C. Hydrick as works manager, Quaker Rubber Corp., Division of H. K. Porter Co., Inc., Philadelphia, Pa., has been announced.

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The Truckstall Manufacturing Co., Cleveland, Ohio, announces the appointment of L. A. Armentrout as regional sales manager for the northeast.

---

Donald E. Hawkins, president, Bay City Shovels, Inc., Bay City, Mich., announces the election of two new officers at the recent annual meeting of the board of directors.

Frank A. Phillips was elected vice-president in charge of sales and Arthur W. Reidinger, secretary.

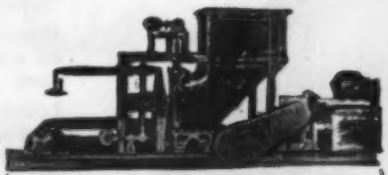
Mr. Phillips joined the company in 1931 and served in various capacities from sales representative to director of sales from which he was promoted. He will be in complete charge of sales and distributor appointments. Mr. Reidinger, who joined the company in 1938, will in addition to his new duties, continue to handle advertising and sales promotion.

Other officers re-elected besides Mr. Hawkins are Owen P. Dulude, vice-president in charge of engineering and Mrs. Elva Wahlstrom, assistant secretary.


SCHAFFER

THIS IS THE SCALE YOU NEED

for improving production and profit records in handling or processing bulk materials



OVER 1400

NOW SERVING INDUSTRY

You're looking at the established "pace-setter" for efficiently performing every scaling job, including weighing, blending, feeding, mixing, recording, and proportioning.

Combining speed, accuracy, and automatic operation, Poidometers boost output records, and promote product uniformity.

These machines are sturdy, easy and economical to operate, and give long service anywhere.

Available with remote controls for showing and changing feed rate, and with total weight recorders.

*Write for our new CATALOG No. 5*

SCHAFFER POIDOMETER COMPANY

2828 Smallman Ave. • Pittsburgh 22, Pa.

POIDOMETER

Brock Tractor Co., of Buffalo, N. Y., has been appointed a distributor in western New York for products manufactured by Pioneer Engineering Works, Inc., Minneapolis, Minn., subsidiary of Poor & Co., Chicago, Ill.

The firm will handle the complete line of Pioneer Continuflo equipment in the counties west of and including Wayne, Seneca, Schuyler and Chemung.

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The Smith Engineering Works of Milwaukee, Wis., announces the appointment of The Roy Klossner Co., of San Antonio, as their distributor in the South Texas area.

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Dorr-Oliver, Inc., Stamford, Conn., has moved their Chicago office to the Merchandise Mart and has opened a new office in the Midland Building, Cleveland, Ohio.

---

Elmer H. Wegner, formerly general manager of manufacturing, has been appointed vice-president of manufacturing by Cleaver-Brooks Co., Milwaukee, Wis.

Also announced was the appointment of the Delval Equipment Corp., 4610 N. 15th St., Philadelphia, Pa., as manufacturers' representative for the sale of Cleaver-Brooks equipment, in the state of Delaware, eastern Maryland, southern New Jersey and eastern Pennsylvania.

---

Olin Mathieson Chemical Corp., New York, N. Y., has announced the following appointments:

M. M. Randle, formerly quality control manager for the Metals Div., is now roll bonding market development manager, and H. A. Ball, formerly acting quality control manager is now quality control manager. They will be headquartered in East Alton, Ill.

James J. Clark has been appointed sales promotion manager of the Ramset Div., with headquarters in Cleveland, Ohio.

Ralph S. Heller is plant manager of the Olin, Ind., cellophane plant which will be completed late in 1956. Mr. Heller will continue as project manager of the new plant with responsibility for design and construction until its completion.

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R. J. Fyfe Equipment Ltd., Regina, Sask., Canada, has been appointed distributor for the entire Province of Saskatchewan by Bucyrus-Erie Co., South Milwaukee, Wis.

H. A. Wiley Jr., has been appointed manager, belting and packing sales by Quaker Pioneer Rubber Mills, Division of H. K. Porter Co., Inc., San Francisco, Calif. He came to Quaker Pioneer in 1950 as a member of its production department.

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Joy Manufacturing Co., Pittsburgh, Pa., has announced the appointment of Donald L. Archibald as district sales manager in the New England area, with headquarters in Boston.

Sauerman Bros., Inc., have moved their general offices to 620 S. 28th Ave., Bellwood, Ill. The new office building is adjacent to their Bellwood plant and provides enlarged facilities for all departments.

---

William A. Yost Jr., has been appointed to the newly created post of vice-president, staff operations, by Allis-Chalmers Mfg. Co., Milwaukee, Wis. He was previously vice-president, general machinery division, a position he has held since September, 1951.


# Why stock many different hardsurfacing rods?

**TWO RODS...**
***NEW ABRASOWELD***
**and**
***FACEWELD***
**now handle your hardsurfacing needs.**

**Abrasoweld** deposits high carbon-chromium alloy for severe impact and abrasion.

**Faceweld** deposits high chromium carbide alloy for severe abrasion, moderate impact.

**SAVES YOU MONEY**
Wear resistance is higher, cost per pound is less than other hardsurfacing electrodes.

**GET APPLICATION WELDIRECTORY**
on hardsurfacing. Send for Bulletin 466 by writing

**THE LINCOLN ELECTRIC COMPANY**
Dept. 5203 • Cleveland 17, Ohio
*The World's Largest Manufacturer of Arc Welding Equipment*

Robert C. McDowell, president of McDowell Co., Inc., Cleveland, Ohio, engineers and contractors, has announced that Curtis L. Willmott, vice-president, will direct the overall sales program for all divisions now included within the company's orbit.

In his expanded capacity Mr. Willmott will not only direct sales activities of the parent McDowell Co., but also those of the Wellman Engineering Co., of Cleveland, its divisions, including Williams Bucket, Akron; Locomotive Crane, Cleveland; Dwight-Lloyd, Cleveland; and the Anker-Holth Division, Port Huron, Mich.

Mr. Willmott has been elected to the Wellman Company's board of directors.

Curtis L. Willmott

Ernest S. Wellhofer

George C. Cregson, plant manager of the wire rope divisions of American Chain & Cable Co., Bridgeport, Conn., for the past 30 years, has retired. He is succeeded by Ernest S. Wellhofer who will take over duties at the company's Wilkes-Barre, Pa., and Houston, Tex., plants. Charles H. Layton replaces Mr. Wellhofer as chief wire rope engineer.

Mr. Gregson joined the then American Cable Co., in 1925 and made a three-month survey of conditions at its two wire rope mills in New Jersey. He was retained as plant manager to put his recommendations into effect. In 1930 he was transferred to Wilkes-Barre to manage ACCO's newly acquired Hazard Wire Rope Works as well as the American Cable operations. In 1939 he supervised construction of the company's wire rope plant at Houston, Tex., and since then has managed both the Wilkes-Barre and Houston plants.

Mr. Wellhofer joined the American Chain & Cable Co. in 1936 and has served successively as chief inspector, chief rope engineer, and for the past three months as assistant plant manager. He has served on a number of industry committees, being an affiliate of the Wire Rope Technical Board and on the American Petroleum Institute Committee on Wire Rope. He is a member of the American Society of Mechanical Engineers and a graduate of the University of Alabama with an industrial engineering degree.

Mr. Layton, new chief wire rope engineer, started with the ACCO organization in 1937 as chief inspector. In 1940 he was advanced to the Engineering Department and, in 1943, was named assistant chief engineer. He is a graduate of the University of Alabama with a civil engineering degree.

---

The Syntron Co, Homer City, Pa., announces the following changes in their sales companies:

Frank Day has been appointed to the staff of Syntron Los Angeles Sales Co., as a tool salesman and serviceman, with headquarters in Los Angeles.

Flavel Nelms has been appointed district manager for all of Tennessee by Syntron Cincinnati Sales Co., with headquarters in Nashville.

John A. Dahlem has been appointed to the sales staff of Syntron St. Louis Sales Co., with headquarters in St. Louis.

Thomas Lewis Hainline has been appointed tool salesman for Syntron Kansas City Sales Co He will handle sales and accounts in that area.

John Sirles, formerly with Syntron New York Sales Co., has been transferred to Syntron Newark Sales Co.

---

Two distributor appointments are announced by Baldwin-Lima-Hamilton Corp., Construction Equipment Division, Lima, Ohio.

Hawkeye Machinery Co., Inc., 1225 Walnut St., Des Moines, Iowa, has been named distributor in the central and eastern portion of Iowa.

Bert Smith Road Machinery Co., Inc., P.O. Box 1266, 321 West Chestnut St., Enid, Okla., has been assigned the State of Oklahoma with the exception of six extreme eastern counties. Bert Smith is also distributor of Austin - Western crushing equipment.

---

The appointment of Jack N. Yetter as sales manager-General Products Div., has been announced by Twin Disc Clutch Co., Racine, Wis. Mr. Yetter is filling the spot recently vacated due to the retirement of E. C. Billings, who has been associated with Twin Disc in an executive sales capacity for 20 years. Mr. Billings will continue to act in a consulting capacity.

A. H. Jackson, former sales manager of the Tower Department, Equipment Division of the Blaw-Knox Co., Pittsburgh, Pa., has been promoted to general manager of the division's newly established engineering and development department.

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The annual dinner meeting of The Kirk & Blum Manufacturing Company's "25 Year Club" was recently held at the Cincinnati Club, Cincinnati, Ohio.

New members of the "25 Year Club" who were presented gold watches were B. J. Wilke and L. H. Stortz. The club now has 49 members with a total of 1,505 years' service.

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The New York district office and warehouse of Leschen Wire Rope Division, H. K. Porter Co., Inc., has been moved to 219 Emmet St., Newark, N. J.

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J. R. Clements, sales manager of the Multiwall Division of the Albemarle Paper Manufacturing Co., Richmond, Va., announces that C. W. Ingham has been appointed sales representative for Albemarle Multiwall Bags in the Ohio territory. Mr. Ingham's office will be located at 81 State St., Columbus, Ohio.

C. W. Ingham

M. Nielsen

M. Nielsen, vice-president of The Babcock & Wilcox Co., New York, N. Y., has been elected to the newly-created post of executive vice-president of the company, according to Alfred Iddles, president. He was also re-elected to the board.

Mr. Nielsen joined Babcock & Wilcox in 1924. In 1950 he was made an executive assistant and placed in charge of the company's contract department.

Mr. Nielsen was elected as assistant vice-president in 1952, and vice-president in charge of the boiler division in 1954, a position which he held previous to his present promotion.

Cummins Engine Co., Inc., Columbus, Ind., announces the promotion of Loyd E. Williams, formerly Rocky Mountain regional manager in Denver, Colo., to manager-distribution. He succeeds Paul J. Every, who is now assistant general sales manager.

Also announced is the opening of the Piedmont Regional Office at 601 N. Elm St., Greensboro, N. C., headed by R. R. MacDonald.

Loyd E. Williams

Roy H. Olson

Roy H. Olson has been appointed director of engineering in the Communications & Electronics Division of Motorola, Inc., Chicago, Ill.

Also announced was the appointment of Robert L. Borchardt, formerly field information supervisor, as assistant manager of this division, succeeding Darrell E. Knight, who has resigned.

---

Ford D. Brown has been named eastern representative for the Gorman-Rupp Co., Mansfield, Ohio. He brings with him over fifteen years' experience in the pump industry, having been associated with such firms as Bowser, Inc., Blackmer Pump Co. and Eco Engineering Co.

Ford D. Brown

Ralph A. Reynolds

Ralph A. Reynolds has been appointed assistant treasurer of The Thew Shovel Co., Lorain, Ohio, after 35 years of service. He started at The win 1920. Prior to his new appointment, he was credit manager, which title and duties he will retain.

**to give you faster bag filling—less waste**

T-P HI-POROSITY, HI-STRENGTH PAPERS CUT FILLING LOSSES TO A MINIMUM

Bag filling can be a quick and simple operation that moves along without a hitch. Or it can be an expensive headache of torn bags, spillage and poor efficiency.

To give you just the bag your operation calls for, Thomas Phillips' paper experts spend considerable time studying the various bag filling processes.

By fully acquainting themselves with actual on-the-job conditions, Thomas Phillips' engineers have developed extra strong sacks that can take large quantities fast without tearing. They have greatly increased porosity to reduce powder, cement and flour filling losses. In fact, whatever your filling problems, you should talk with Thomas Phillips' experts; chances are they have the answers.

Thomas Phillips is a fully integrated paper mill—from pulp to finished product. They can furnish shipping sacks of every type and size—one to five walls. Send for free literature illustrating complete line.

**thomas Phillips co.**
AKRON, OHIO

# Loads 10 TONS every 60 seconds

Nelson's new B-68 is the heaviest, toughest most powerful loader you can buy! . . . It's a big machine, because it is built specifically to speed up the working cycles of the largest trucks . . . It will pour 10 tons of material per minute into the truck, distribute it evenly from front to rear, eliminate 'jockeying' under the chute, all in one smooth, continuous operation—*under the control of one operator!*

The B-68 is rugged—stands up under hard, day after day usage . . . Moves over the road at 20 m.p.h. . . . Pays off in profits because no other machine can load as fast . . , Practical if you load only 1,000 tons per day yet *can handle 3 times that amount all day every day!* Check these features—no other loader can match them:

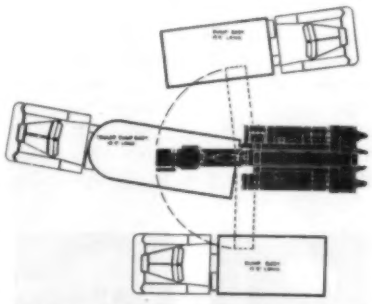
**WEIGHS 38,000 LBS. • 115 H.P. ENGINE • 4-WHEEL DRIVE • HYDRAULIC CROWD**
**FULL POWER STEERING • HYDRAULIC CONTROLS • 20 MILE PER HOUR ROAD SPEED**

## New Nelson B-68

## NEW NELSON P-11-B SWIVEL DISCHARGE CONVEYOR

Here's a heavy-duty loader that can pour up to 4 cu. yds. per minute into the largest trucks — and save extra time by eliminating 'spotting' of trucks in fixed loading locations.

Swivel discharge conveyor can discharge at heights of over 14 ft. and reach more than 11 ft. to load large trucks with sideboards, *or* to load long trucks evenly without maneuvering back and forth under chute. The P-11-B is mounted on rubber for fast travel and transport. Crawler mounted model Q-11-B also available.



### LOADS FROM ANY POSITION TURNS THROUGH FULL 180 DEGREE ARC!

Diagram indicates a few of the positions from which trucks can be completely loaded as swivel belt conveyor swings on a 180° arc! Conveyor turns, lowers or raises independently of the bucket boom — lets trucks stay in position as loader moves into material.

Hydraulic controls allow operator to smoothly and quickly shift from one truck to another as loading is completed . . . No need for trucks to "jockey" under discharge chute to receive a complete load!

Huber-Warco Co., Marion, Ohio, has announced the following organizations as distributors:

Long-Talbott Equipment Co., 820 Blossom St., Columbia, S. C.; Boehck Engineering Co, Inc., 5806 Long Drive, Houston, Tex.; Wilhelm-Davies Co., Inc., North Colony Rd., Rt. 5, Wallingford, Conn.; Kessler-Simon Machinery Co., 1545 Exchange Ave., Oklahoma City, Okla.; R. B. Wing & Son Corp., Albany, N. Y.; Dempster Brothers, Inc., Knoxville, Tenn.; Elphinstone, Inc., 6212 Belair Rd., Baltimore, Md.; The O. S. Stapley Co., Phoenix, Ariz.; The Gledhill Road Machinery Co., Galion, Ohio; Equipment Distributors, Inc., 3708 Venable Ave., Charleston, W. Va.; and Road Machinery, Inc., Devon, Pa.

---

Manitowoc Engineering Corp., Manitowoc, Wis., has announced the addition of several new authorized distributors.

Dalton-Cooper, Inc., 200 W. 34th St., New York, will handle the Manitowoc line in various parts of Europe and the Orient.

Compressed Air Equipment, Ltd., of 328 DuPont St., Toronto, will represent Manitowoc in the territory of Ontario. Automotive Products Co., Ltd., of 3282 Wellington St., Montreal, will be the authorized Manitowoc distributor at Quebec.

Also mentioned in the announcement was Union Commercial Hispano Americana, S.A., of Ezequiel Montes 102, Mexico, D.F., who will represent the manufacturer in the Republic of Mexico.

---

Everett I. Morse, central paper buyer fo rBemis Bro. Bag Co., Boston, Mass., has been named director of paper procurement.

Mr. Morse joined Bemis in 1925 and was put in charge of the paper procurement department when centralized paper purchasing was established in 1950.

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Appointment of V. W. Weeks & Sons, Inc., Glens Falls, as distributors of Galion Allsteel dump bodies and hydraulic hoists in east central New York, is announced by The Galion Allsteel Body Co., Galion, Ohio. V. W. Weeks, president, will direct sales.

Also announced is the appointment of Acme Spring & Equipment Co., Charleston, as distributors in central West Virginia.

Sales will be supervised by S. J. Kish, general manager and R. Brown, sales manager.

The General Machinery Corp., 1227 W. Marietta St., Atlanta, Ga., have been appointed as agents in Georgia for The Williams Patent Crusher & Pulverizer Co., St. Louis, Mo. John A. Miller is president, W. R. Turner vice-president and Paul Conner sales manager.

---

The Southwestern District warehouse and headquarters for Raybestos Division of Raybestos-Manhattan, Inc., at 2802-04 Taylor St., Dallas, Tex., has moved to new and larger quarters. John T. Ginocchio is southwestern district manager.

John P. Witter has been appointed by the Kraft Bag Corp., subsidiary of Gilman Paper Co., New York, N. Y., to represent them in North and South Carolina and Virginia.

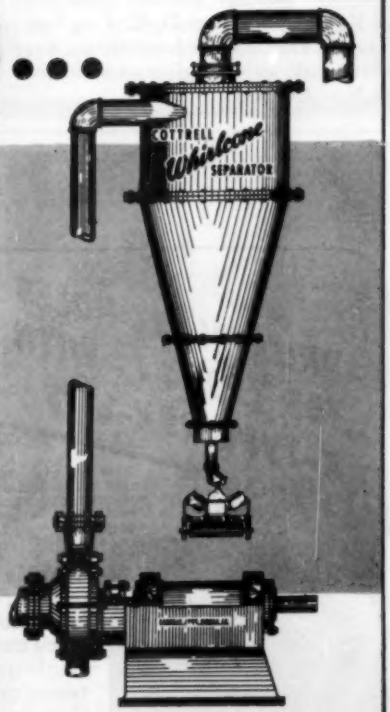
---

William T. Welch, chairman of the board of Ajax Flexible Coupling Co., Inc., of Westfield, N. Y., announces the election of the following officers at the annual meeting of the corporation: Wayne Belden, president; Charles W. Belden, vice-president; Harley E. Northrop, treasurer; Robert G. Cady, secretary.


Now You Can Recover Your Fines With This...

COTTRELL Whirlcone SEPARATOR PAT. PENDING

Thousands of tons of valuable sand in the minus 50 mesh range are lost with wash water in Sand Plants all over the world. The well-known Cottrell Whirlcone Separator will save this sand at small cost.




COTTRELL ENGINEERING CO.
DIVISION OF
GIW
GEORGIA IRON WORKS CO.
AUGUSTA, GEORGIA

The Whirlcone will de-slime and dewater these fines with approximately 95% efficiency in the plus 200 mesh range. There is a GIW Slurry Pump and a Cottrell Whirlcone Separator combination to fit any plant flow sheet. If you are losing fines, let us have your inquiry giving approximately the volume of flow and the nature of the losses. Our recommendations and literature will follow.

The Schield Bantam Co., Waverly, Iowa, has announced the appointment of Buel M. Wallis as general sales manager. He was formerly general sales manager of the Adams Division, LeTourneau - Westinghouse Co., Indianapolis, Ind.

New sales assignments in the mechanical goods division, United States Rubber Co., New York, N. Y., have been announced.

Robert H. Bowman, formerly district manager at San Francisco, has been appointed to the same position in New York. He is succeeded in San Francisco by Arthur C. Tharp, formerly sales manager for the Milwaukee district.

Osmond S. True has been placed in charge of the Boston district, a transfer from his post in the same capacity in New York.

New district manager for the Denver branch is Elmer G. Morrill, formerly a salesman in the Houston district.

W. T. Pearl, who was a salesman in the Tulsa district, has been appointed assistant district manager in Kansas City, and D. C. Lee, formerly a Dallas branch salesman, has been made assistant district manager in New Orleans.

New executive appointments in the Brake Shoe & Castings Division of American Brake Shoe Co., New York, N. Y., have been announced.

Named to the new post of division chairman is Fred Biggs, formerly division president, with headquarters in New York City.

Appointed to fill the vacancy of division president and chief executive officer is Stephen S. Conway, formerly first vice-president in charge of sales.

Moving up to sales vice-president for the division is John F. Ducey Jr., a vice-president since 1953.

Named to the new post of division vice-president in charge of railroad sales is Sam R. Watkins, formerly executive vice-president of the National Bearing Division.

Straub Manufacturing Co., Inc., Oakland, Calif., designers and builders of the KUE-KEN jaw and gyratory crushers, have recenlty opened a new plant to serve the western states, western Canada, Alaska, Mexico and Central and South America. The Pennsylvania Crusher Division, West Chester, Pa., is exclusive licensed manufacturer and distributor of KUE-KEN crushers in eastern United States and Canada.

DRILL BLAST HOLES FOR LESS . . . WITH X-TYPE ROK-BITS

For use on 1½- and 2-in. rods. Made to fit directly on the steel of two machines, eliminating expensive adapters.

←—3½"—4" or 4½"—→

Carbide X-type Rok-Bits® withstand the rapid-fire battering of the larger drilling machines longer, help increase your profits by cutting your drilling cost. They drill single gauge holes, give more footage between grinds, minimize secondary drilling. Can you afford to waste manpower on less effective bits? Write plant, nearest you, for Bulletin B-1. *Are you interested in our 6" Rok-Master Bit with API threads?*

**Brunner & Lay Products**

Brunner & Lay, Inc.
9300 King St.
Franklin Park, Ill.

Brunner & Lay Rock Bit Corp.
2514 East Cumberland St.
Philadelphia 25, Pa.

Brunner & Lay, Incorporated
2425 East 37th St.
Los Angeles 58, Calif.

Brunner & Lay, Inc.
150 Leslie St., Dallas, Texas

Brunner & Lay Rock Bit Corp.
Sweeten Creek Rd., Asheville, N.C.

Brunner & Lay Corp.
660 N. Tillamook St., Portland 12, Ore.


J. W. Bloomquist, sales manager of Euclid Division, General Motors Corp., Cleveland, Ohio, has announced the appointment of Mitchell Distributing Co., in Raleigh, as authorized dealer for the entire state of North Carolina. J. W. Greene is sales manager and Hugh Shaw is service manager.

Ray Long Equipment, Inc., 820 Blossom St., in Columbia, has been appointed dealer for the entire state of South Carolina.

Evans Engine and Equipment Co., 1230 Westlake North, Seattle, will represent Euclid in western Washington and the Territory of Alaska. C. R. Evans is president and B. F. Evans is vice-president of the company.

General Diesel and Equipment Co., of Williston, North Dakota, headed by W. A. Sweeney, is the new Euclid dealer for the entire state of North Dakota and Clay county in Minnesota.

Formation of a Special Products Division to handle the development and manufacture of a diversified line of non-automative products has been announced by The White Motor Co., Cleveland, Ohio. Kenneth F. Ode, manager of government contracts has been appointed general manager in charge of the new division.

Assisting Mr. Ode in the development of the new division are E. R. Sternberg, H. G. Collin, M. B. Myhre and J. Pitts Jarvis, Jr., all presently associated with White Motor in either production or sales.

Jeffrey Mfg. Co., Columbus, Ohio, announces the following personnel changes:

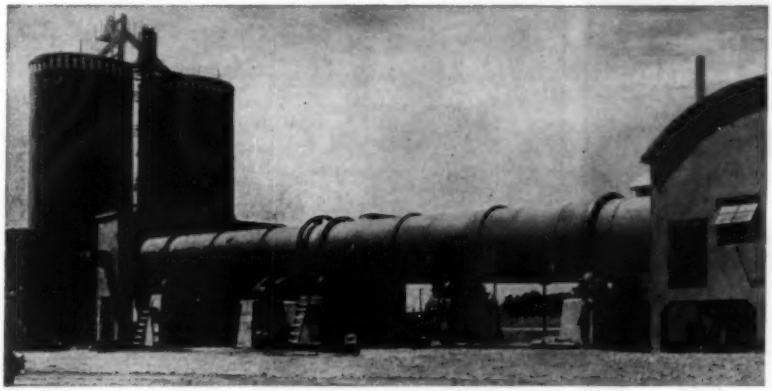
Harold C. Medley, veteran of 18 years' service with the company, assumes the position of chief engineer of the Conveyor Division. He formerly was manager of the conveying research and development section.

Arnie J. Kindig has been appointed to replace Medley as manager of conveying research and development. Previous to this assignment he was in charge of the chain and belt idler phase of research and development.

The new chief engineer of the Mining Division is Morton B. Curley, who joined the mining research and development section 20 years ago. Prior to this latest assignment, he was assistant to the vice-president in charge of engineering.

Moving into the newly created position of chief consulting engineer to the Mining Division is John Beltz.

# DEPENDABLE KILNS, COOLERS, DRYERS—ANY SIZE SINGLE OR MULTIPLE INSTALLATIONS—GO WEBB



Here are two Kilns 8' diameter x 125' long at the Buildex, Inc. plant, Ottawa, Kansas, used for making Light Weight Aggregate. They also have two Rotary Coolers 5' x 6" diameter x 50' long, that work with the Kilns.

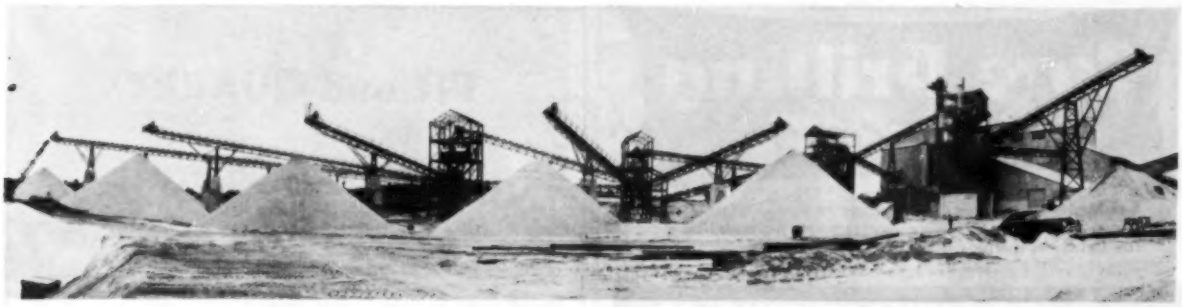
The WEBB Corp., pioneering heavy industrial equipment since 1881, is strategically located; well staffed with consulting engineers, skilled mechanics and modern equipment.

- Crushers
- Conveyors
- Scales
- Screens
- Hoppers
- Brick Yard Equipment
- Semi-Drop Bottom Trailers

THE **WEBB** CORP., WEBB CITY, MISSOURI, U.S.A.

*Write for complete information*

We are manufacturers of Plate Fabricating Machinery • Truck and Trailer Wheels • Mining Machinery • Railroad, Motor Truck and Industrial Scales • Products for Coal, Mining, Lead and Zinc • Smelters • Brick and Cement Plants • Rock Quarries



# We're Going to Need MORE PRODUCTION AT THE PITS TO PUT MORE HIGHWAYS ON THE MAP

Proposed by the President is a multi-billion dollar highway program designed to help keep pace with today's enormous growth in highway traffic. To put this program into effect, new production facilities for sand, gravel, stone will be required. It will mean new business for the pits and plants equipped to handle it. Will you be prepared to meet the demand?

Stephens-Adamson can help you . . . *now*. For example, the plant shown above was designed, engineered and operating in record time following a devastating fire. The complete system includes belt conveyors, screens and crushers that are handling sand and grit at the rate of 410,000 tons a year.

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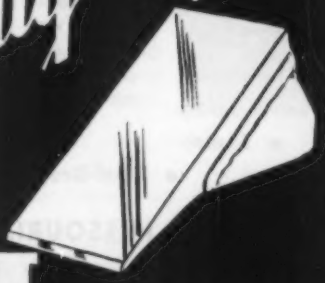

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Tough and rugged, Frederick Wrecking Balls deliver crushing power where you need it. They're made to stand abuse—to give you long, economical service. Inverted steel eye gives cable protection plus free-swinging action. Special release hooks for free dropping also available. Shipments made promptly from stock of these sizes: 500 lbs., 1000 lbs., 1500 lbs., 2000 lbs., 3300 lbs., 4000 lbs., 5200 lbs., 6500 lbs., 8000 lbs.

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**on SATURDAY, JUNE 11, 1955**

At 12 Noon C.D.S.T.

*Consisting of*

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Smith #9E, Austin #5 & #3 Gyratory crushers, Sturtevant #2 Ring Rolling Mill, Iowa 18x30 Crushing Rolls, Universal #18 Pulverizer, Double Vibrating Screens, Gas and Diesel Engines, 24x84 Belt Conveyors, 50 Ft. Bucket Elevators, Air Compressors, Wagner and G.E. 125 h.p. Motors, Caterpillar Bulldozer, P & H Cranes, Lime Spreaders, Dump Trucks.

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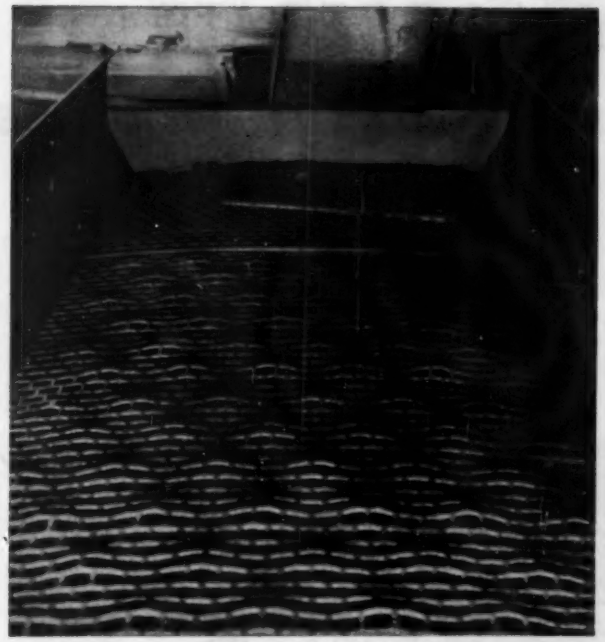

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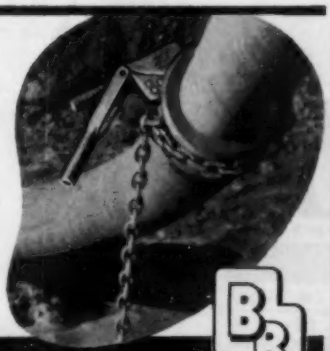
**Sturdy • Practical • Dependable • Economical**

Furnishes a positive seal for round flexible joints. Used by leading dredging and hydraulic sand-and-gravel operators, and the U.S. Engineering Corps. This Multi-use chain sleeve clamp is easy to apply... positive in action. Write for illustrated folder, today.



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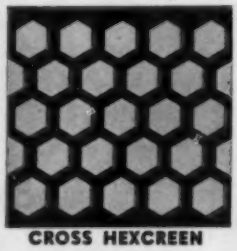

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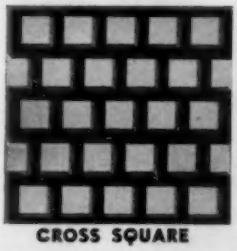
*Perforated*
## STEEL SCREENS

set the pace for efficient, economical screening with peak sizing accuracy... less blinding... longer service life.

Specify CROSS special analysis steel Sections and Decks . . . they insure better performance in Revolving, Vibrating and Shaking Screens.



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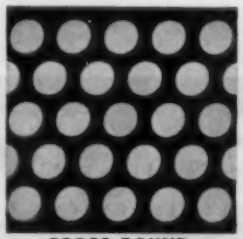

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## from low grade sources

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JUNE 1955

# THE CONCRETE MANUFACTURER

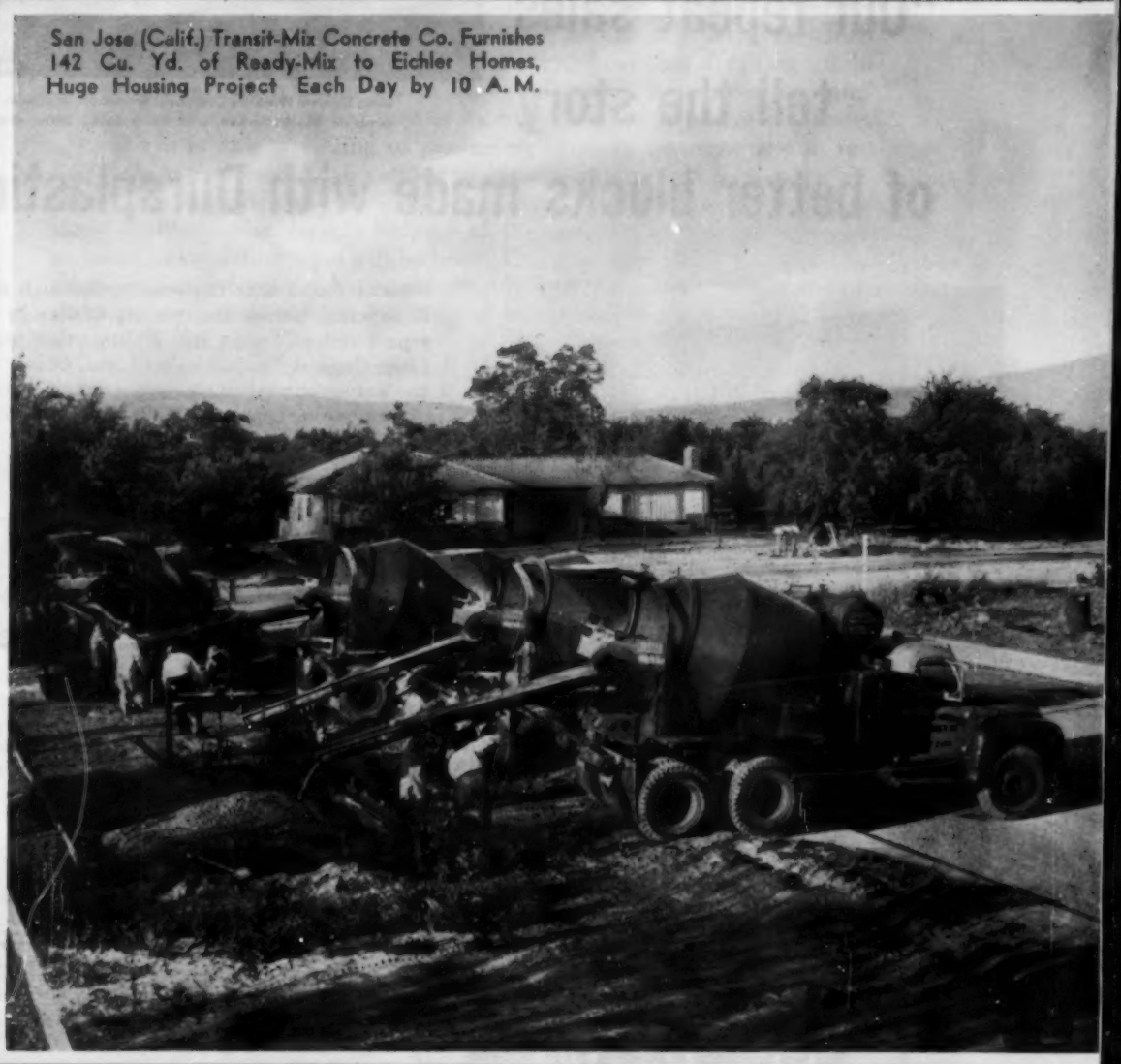
A SPECIAL SECTION OF PIT AND QUARRY

Edited for Producers of

Concrete Building Units

Pipe

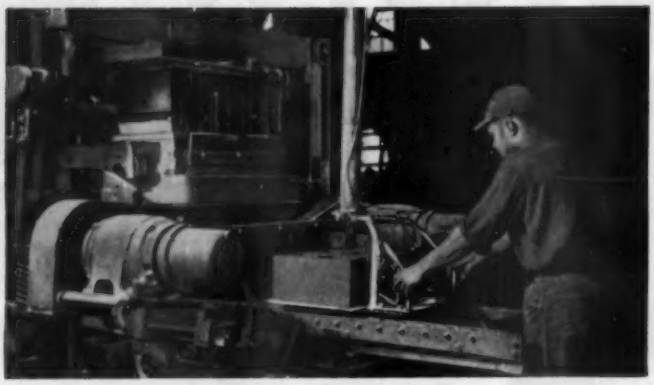
Ready-Mix Concrete



San Jose (Calif.) Transit-Mix Concrete Co. Furnishes 142 Cu. Yd. of Ready-Mix to Eichler Homes, Huge Housing Project Each Day by 10 A.M.

CONCRETE-BLOCK MANUFACTURER SAYS:

# "Our repeat sales tell the story of better blocks made with Duraplastic*"



Lima Cement Products Company workman lifts three green concrete blocks made with Duraplastic from machine.

**HERE** is Standard Oil of Ohio's bulk storage building at Lima. Duraplastic block from Lima Cement Products Company was specified by sub-contractor for masonry Floyd Stemen, Lima, Ohio.

**HERE, TOO,** Stemen chose Duraplastic-made block from the Lima Cement Products Company. This is the new Kresge store on the main street of Lima.

"We've found that uniformity and high strength of concrete blocks are two big factors in getting repeat orders," says Bill Ebling, vice-president, Lima Cement Products Co., Lima, Ohio. "During the last seven years we've depended on Duraplastic air-entraining cement to help us build these qualities into our product."

More and more manufacturers are discovering the repeat sales appeal of concrete products made with Duraplastic...the economy this cement offers in production and handling. Mixes are rubbery and cohesive, feed easily through machines and produce concrete highly resistant to the passage of water.

## YET DURAPLASTIC COSTS NO MORE

It sells at the same price as regular cement and requires no unusual changes in procedure. Complies with ASTM and Federal Specifications. For descriptive booklet, write Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

**NIFTY SAYS:** The appearance of Duraplastic-made products works for you as a built-in salesman. Customers go for the clean, true edges and the richer face texture—especially when harsh aggregates are used.

**THRIFTY SAYS:** Build up profits and cut down production costs with Duraplastic. Manufacturers find less breakage in handling green machine-made products . . . fewer costly culls and throwbacks.

**OFFICES:** Albany • Birmingham • Boston • Chicago Dayton • Kansas City • Minneapolis • New York Philadelphia • Pittsburgh • St. Louis • Waco

*"*Duraplastic" is the registered trade-mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.*

CM-D-156

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# DURAPLASTIC

AIR-ENTRAINING PORTLAND CEMENT

**Makes Superior Concrete Products at No Extra Cost**

UNITED STATES STEEL HOUR—Televised alternate weeks—See your newspaper for time and station.

The CONCRETE MANUFACTURER

June 1955

# Construction Prospects Bright

THE record volume of construction in recent years is generally credited with being largely responsible for the prosperity to which we are all becoming accustomed. So much so that a falling off in the volume of construction would be a deterrent to investment and purchases and would probably result in a parallel decline in business volume.

There is now a feeling of pessimism in some quarters due to the belief that the present high volume of construction cannot long continue. The volume of highway construction is expected to set new records for some years to come, largely because of the certainty that a vast national network of superhighways will be built. This is counteracted, however, by the fact that federal public construction has fallen off somewhat, and by the growing belief that the building of private dwelling units is nearing the saturation point.

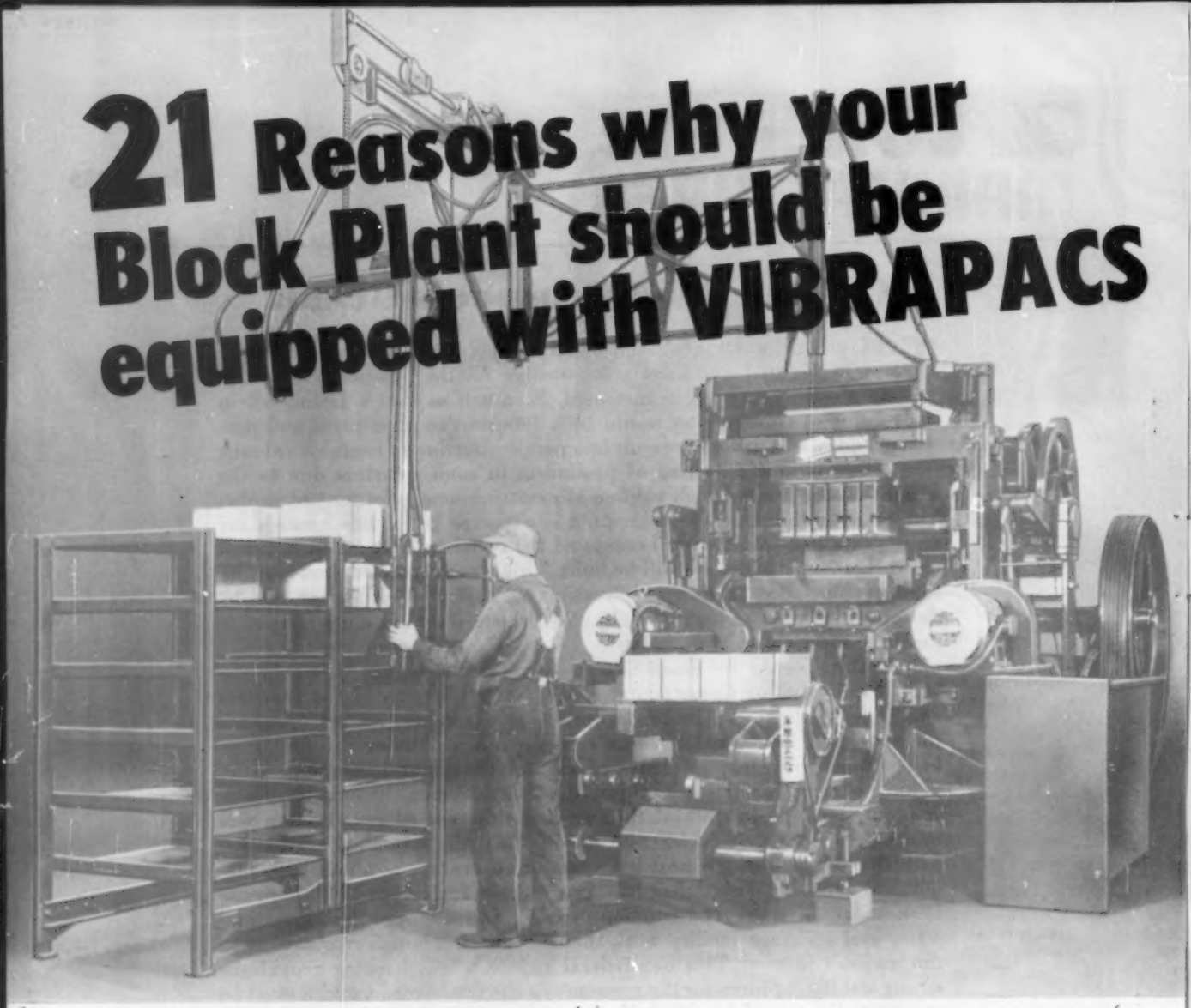
Nothing could be more timely, therefore, than an article in the May, 1955, issue of *Construction Review*, a publication of the Business and Defense Services Administration. This is a report on requirements for state and local public works construction which for the first time brings together recent estimates of various groups and agencies on the volume of need for non-federal public construction in the next ten years. It points out that in spite of the fact that this type of construction was at the record level of $8,600,000,000 in 1954, the estimated need is for $200,000,000,000 in the next ten years or an average of about $20,000,000,000 annually. This deficit has occurred although since 1949 there has been more highway construction, school and hospital building, and water and sewerage facility work than in any previous 5-year period in the nation's history. This non-federal public works backlog provides a strong stabilizing force for the economy in the next decade, and it must be substantially erased by 1965 if severe community problems are to be avoided.

In the last ten years highways, schools, hospitals, and water and sewage facilities accounted for nearly 90 percent of the total expenditure for non-federal public works. The total cost of needed highway construction over the next ten years is estimated at $101,000,000,000 by the U. S. Bureau of Public Roads. The Office of Education estimates that school building requirements will total $41.5 billion for that period. Construction needs for water and sewerage works have been estimated at $25,000,000,000 by the Water and Sewerage Industry and Utilities Division of the Business and Defense Services Administration of the Department of Commerce. The Public Health Service estimates civilian hospital needs for this period at $21,000,000,000. Estimates for other types of non-federal public works construction total $23,000,000,000.

Even if these needs are somewhat overestimated, they should be a potent factor in keeping our economy in high gear. Large volumes of ready-mixed concrete, concrete building units, concrete pipe, etc., will be needed for this work.

Walter E. Trauffer

# 21 Reasons why your Block Plant should be equipped with VIBRAPACS



1. VIBRAPACS are made by skilled craftsmen, using the finest precision machine tools available and backed by continuous research and development.
2. VIBRAPACS are fully automatic, including front feeding of pallets.
3. You get fast, continuous production of high quality block with slow moving cam operation.
4. Unusually low operating cost.
5. Undirectional vibration from two 10 hp. high starting torque motors.
6. Vibration under pressure of 2000 pounds.
7. Instantaneous mold release — quick attachment change.
8. All sizes and styles of block, brick or tile are made on one set of plain pallets.
9. One man off-bears green block and returns empty pallets. No lifting. Off-bearer merely guides the power hoist.
10. VIBRAPACS are equipped throughout with anti-friction roller bearings. Assure smooth, trouble-free operation.
11. Steel side frames — 1½" thick — give permanent alignment for all shaft bearings.
12. Gravity actuated block moving weights assure smoother delivery of finished block at high speeds.
13. New back apron wearing plate has special hardened wearing strip.
14. Double arm boom for off-bearing hoist assures perfect balance and ease of control.
15. Timken 7½" diameter roller bearings on pallet receiver shaft assure lifetime service.
16. Automatic lubrication — all bearings fully protected.
17. Automatic cam-operated pallet cleaner — a built-in feature.
18. Automatic height and density control — for accurately sized, high-quality block.
19. Complete set of tools, mounted on tool board, for servicing machine.
20. Single starter for synchronized starting of BOTH 10 hp. vibrating motors.
21. All parts made of proper alloy steel are heat-treated for case depth and hardness and 100% inspected.

*Ask your nearby Besser representative for Vibrapac literature — or write directly to the home office.*

## BESSER COMPANY

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*Complete Equipment for Concrete Block Plants*

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# news of the concrete industries

## Oregon Unit Masonry Assn. Announces Design Contest Utilizing Masonry Materials

A $1,000 home design competition for architects, draftsmen of architectural firms, and students of architecture in Oregon and southwestern Washington has been announced by Monte Smallen, president of the Unit Masonry Association of Oregon.

Entries will be judged on the basis of the best home design incorporating masonry materials, having floorspace of at least 1,350 sq. ft., and appropriate for the climate of the Northwest. Entrants must have registered with Holman J. Barnes, A.I.A., professional advisor to the Unit Masonry Home Competition, 514 Henry Building, Portland, Oreg., by June 2, and the contest ends on August 4, 1955. Masonry materials to be included in the home design include concrete block, brick, glass block, stone, ceramic tile, structural glazed tile, granite, and marble.

Judges will include three Oregon architects, the president of the Portland Home Builders Association, and one member of the Unit Masonry Association of Oregon. Prizes are as follows: first prize, $300; second prize, $200; third prize, $100; and 16 $25 prizes for honorable mention.

This organization recently held its first annual meeting to elect officers and launch its activities. (See illustration.)

## Chaffee and Muth to Head S. California Masonry Assn.

Officers of the Concrete Masonry Association, an organization of the concrete block manufacturers of Southern California, were elected at the April meeting.

Those elected are as follows: president, E. L. Chaffee of O'Kelley-Eccles Company, Baldwin Park; vice-president, Pete Muth, Orco Block Company, Stanton; secretary, H. C. Shirley, Superior Concrete Blocks, Temple City; treasurer, Roy Beal of Roy Beal, Inc., El Monte.

Directors elected for the coming year are R. F. Higgins, Leo Howard, T. N. Jamieson, E. P. Ripley (retiring president), and Mike Simovich.

The principal project of the association during the last year has been the preparation of a *Concrete Masonry Design Manual.*

## *Coming Events*

*June 26- July 1, 1955—Atlantic City.* 58th annual meeting, American Society for Testing Materials. Chalfonte-Haddon Hall.

*August 8-10, 1955 — Atlantic City.* Annual convention, National Cinder Concrete Products Association, Chalfonte-Haddon Hall.

*October 17-21, 1955—Chicago.* 43rd National Safety Congress and exposition. Conrad Hilton, Congress, Morrison, and La Salle Hotels.

*January 23-24, 1956. New Orleans.* 36th annual convention, National Concrete Masonry Association, Roosevelt Hotel.

*February 13-16, 1956 — Chicago.* 26th annual convention and biennial exhibit, National Ready Mixed Concrete Association. Headquarters, Conrad Hilton Hotel; exhibit, Coliseum.

## Southern Materials Co. Buys Outstanding Stock Of Southern Block & Pipe

The acquisition by Southern Materials Company, Inc., of the outstanding stock of Southern Block and Pipe Corporation, of Norfolk, Va., was announced by H. C. Hofheimer II, chairman of the board of the materials company.

Merger of the firms brings together two of the larger suppliers of building materials in the state. Southern Block is a multimillion-dollar operation, and the annual volume of business of the combined operations reportedly will be about $15,000,000.

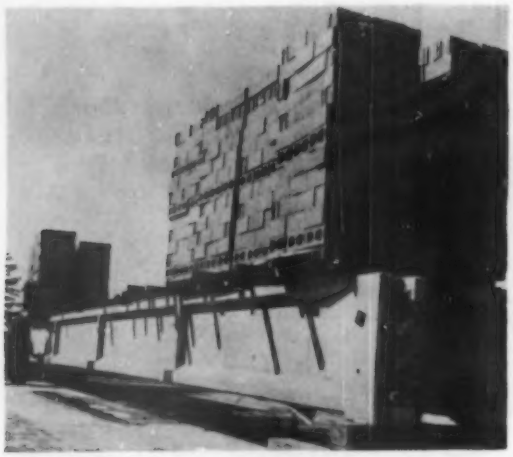
James P. Sadler, vice-president in charge of operations in the Tidewater area, and Richard C. Goodman, secretary-treasurer and general manager of Southern Block, stated that the merger would be beneficial in enabling the two companies to pool their research and production resources. Officials of both companies are interested in the development and promotion of prestressed concrete and precast concrete products.

## Washington Concrete Makers To Meet in British Columbia

The Concrete Products Association of Washington will hold its annual summer convention at the Harrison Hot Springs Hotel at Harrison Hot Springs, British Columbia, Canada, on June 10, 11 and 12.

W. S. Wilson, president of the association, announces that highlights of the meeting will be discussion of new advertising material and the annual election of officers.

● Guests of honor at the first annual banquet of the Unit Masonry Association of Oregon, held in April at Portland (left to right): William Bowes, City of Portland; Donald Stuart, Oregon chapter, A.I.A.; Walter Benard, City of Portland; Glenn Stanton, F.A.I.A., speaker; Ray Wimer, past-president, Unit Masonry Association; Monte Smallen, new president of the association; Guy Arrington, F.H.A., Portland office; Carl Smithwick, president, N.C.M.A.; John A. McCloud, Portland Home Builders Association; and Ralph Holm, Bricklayers Union.



● Load-testing prestressed Lite-Rock expanded shale concrete beams for the 280 ft. Kenai River bridge at Schooners Bend, Alaska, with cubes of concrete masonry units. These beams were made by the Empire Building Material Company, Portland, Oreg. Unusual strength was achieved with pretensioning, rather than by using reinforcing steel. The total prestressing tension per beam is 600,000 lb. Tests made on the beams showed a strength of 5,600 psi.

### Rockwin Prestressed Concrete To Make "Package" Buildings

At Norwalk, Calif., the Rockwin Prestressed Concrete Corporation will soon go into production, turning out prestressed concrete building units. This newly-organized firm is headed by Winthrop Rockefeller and Morris S. Pynoos, the latter a civil engineer and builder in the Los Angeles area.

The plant will produce complete "package" concrete industrial buildings designed so all units, including wall sections, interior columns, girders, and roof slabs are precast and delivered to the site ready for erection. All casting will be done in the open on casting beds 14 ft. wide by 450 ft. long, each accommodating 24 50-ft. tapered girders per day, or 5,000 sq. ft. of complete precast concrete roofing.

---

The Michigan Ready Mixed Concrete Association, Inc., elected the following officers at their annual meeting in Lansing recently: Frank Anderson, president; Stanley Ernst, vice-president, and Don I. Battjes, treasurer.

### W. W. Karl Joins Lelite Staff As Division Sales Manager

W. W. Karl

William W. Karl has been appointed division sales manager for Lehigh Materials Company, Allentown, Pa., it was announced by W. F. Atkins, vice-president and general manager of the company. He will be in charge of sales engineering for poured concrete works.

Mr. Karl joins the Lelite organization after having been associated for the last five years with M. F. Hickey Co. Inc., Brooklyn ready-mixed concrete producer, where he was general manager. He was a technical service engineer for Universal Atlas Cement Company for 2½ years, and had been assistant borough engineer in Glen Ridge, N. J.

---

Almon D. Wellman, owner of the Wellman Concrete Company, Vancouver, Wash., died recently. He was 67 years old.

### Thomas W. Ryan Elected to Head Unit Masonry Assn. Of Metropolitan St. Louis

Thomas W. Ryan, vice-president and general manager of the Alton Brick Company, Alton, Ill., was elected president of the Unit Masonry Association of Metropolitan St. Louis at the association's first organization meeting.

Approximately 500 association members attended, representing union labor, mason contractors, brick, stone and concrete block manufacturers, material dealers, and structural tile and glass block dealers. Officers were elected and an address was delivered by William B. Ittner Jr., St. Louis architect.

Others elected to office are as follows: Leo F. Havey, Bricklayers-Stone and Marble Masons Union, Local No. 1, vice-president; Robert Conradi, Banner Sand & Materials Company, secretary; and David Sloss, mason contractor, treasurer.

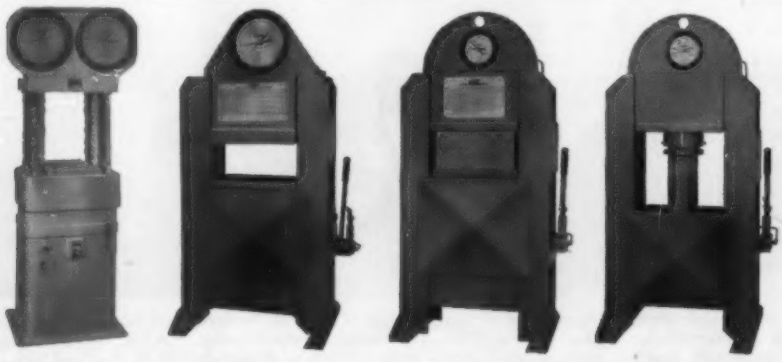
### New Kansas Ready Mix Plant Installs Block Facilities

The Jacksonville Concrete Company, Jacksonville, Fla., formerly named the Ingram Concrete Company, is now in operation at a recently completed $500,000 plant. The operation produces 100 yd. of ready-mixed concrete per day.

The firm has 28 mixer trucks, and sales and repair trucks which are radio equipped. Martin Stein, president of the firm, stated that a second batching tower is being erected to serve a concrete block plant now under construction.

---

Wesley C. Pietz, former Pittsburgh district manager of the Raymond Concrete Pile Company, has been named president of the firm's Canadian subsidiary, Raymond Concrete Pile Company, Ltd. Richard O. Marsh Jr. has been transferred from Baltimore to succeed Mr. Pietz.

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*SEE FOR THEMSELVES*

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FORNEY'S, INC.

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**COMPLEX TO LOOK AT, BUT SIMPLE TO DRIVE:** Four traffic levels in a single bridge structure makes a lot of sense to Los Angeles motorists. It enables the traffic of two crossing Freeways to interchange with a simple turn in the desired direction and provides a right-hand take-off and junction, and minimum travel distance, at all times. California Division of Highways Official Photos.

# mixed in transit . . .

Because mobile truck mixers travel nimbly where it is not practical for other equipment to operate, ready mixed concrete has long been the preferred material for building and paving concrete highway "structures." Modern highways, turnpikes and expressways, with their entries, exits, grade separations and interchanges, have so increased this use that ARBA estimates show ten new truck mixers are now needed, to pour structures, for every new spreader and finishing machine required to finish pavement slab.

Highway standards are high standards. State Highway Departments, in increasing numbers, specify that ready mixed concrete be processed in truck mixers of proper design, capacity, mixing speed and water control accuracy, as certified by Bureau Rating Plate.

You have a right to insist on this Rating Plate. It certifies compliance with high industry standards maintained for your protection by the Truck Mixer Manufacturers Bureau.

***These manufacturers comply with Bureau standards:***

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**CONSTRUCTION MACHINERY CO.**
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**WORTHINGTON CORPORATION**
Plainfield, N. J.

## Award-Winning Designs Featured in Publication Of Wis. Products Assn.

The Wisconsin Concrete Products Association has recently published a 48-page booklet containing prize-winning homes in its recent architectural competition. These designs are prize-winners selected from drawings submitted by architects, designers, draftsmen and students of architecture. One of the unique features of this publication is the fact that it contains prize-winners from the Wisconsin competition, and also from Nebraska and Michigan.

The designs shown are for one-story, full basement two bedroom concrete masonry homes of 1,100 sq. ft. and three bedroom homes of 1,200 sq. ft. of floor area.

Through arrangements made by the National Concrete Masonry Association, N.C.M.A. members may obtain copies of this publication upon application to the Wisconsin Concrete Products Association, 820 W. Montana Street, Milwaukee 15, Wis.

## Twin City Concrete Products Announces Staff Promotions

The following appointments have been announced by the Twin City Concrete Products Company of Minneapolis, Minn.:

Andrew C. Houle, formerly sales manager of the firm was promoted to the post of general manager.

George Constans, who was previously regional sales manager, was named general sales manager.

Succeeding Mr. Constans as regional sales manager is Lee Tvedten.

W. D. Oldham, stationed in Des Moines, was named Twin City representative in Iowa and Nebraska.

● Dale Cobb (left), president, Autoclave Building Products Association and sales manager for the Jackson Ready-Mix Concrete Company. Jackson, Miss., presents a $1,000 award to Steve H. Blair, architect, Hattiesburg, Miss., the 1st-place winner in the Jackson Ready-Mix Concrete Company's concrete masonry home design contest. The award was made at the annual meeting of the Mississippi Chapter of the American Institute of Architects.

# Rx Ready Mix

By Harry F. Thomson

## The Hazard of Guaranteed Strength

ONE of the innovations which followed the wide acceptance of ready-mixed concrete was the introduction of an alternate method of specifying the quality of concrete desired in a given structure. This alternate was stating the strength to be developed at a given age, usually 28 days.

The previous general custom of specifying the composition by arbitrary volume proportions, commonly 1-2-4, resulted from the practice used in the northeastern states during the early days of portland cement. The measurements of volume were inaccurate, as for instance using wheelbarrows with unknown heaping for the sand and coarse aggregate; and little attention was paid to the bulking of sand from moisture. The net result was frequently less cement in the mix than intended in the specification. Actually, some operators interpreted 1-2-4 to mean: 1 sack of cement, 2 wheelbarrows of sand, and 4 wheelbarrows of stone or gravel.

Various mechanical means were proposed to improve the accuracy of proportioning. One scheme was the "Ahlers balance", which applied the water-cement ratio by balancing a pan of cement at one end of a lever arm with a pan of water at the other end, with the arm resting on an adjustable fulcrum whose position between the two pans could be set at the specified ratio.

Another scheme for improved measurement was the Blaw-Knox "inundator" in which the sand was submerged in water to eliminate the bulking effect from the variable moisture content. This inundator method was widely used on large structures, but was not suitable for paving because the water for inundation was more than that needed for 1- and 2-in. slump concrete.

In the late 1920's the practice of specifying the cement content in bags per cubic yard of concrete was introduced on large dam construction, and was also adopted by many state and city highway departments. About the same time commercial ready-mix began to appear in larger cities. Many of these early operations mixed in stationary mixers—*i.e.*, central mixing—and delivered by dump trucks. As the producers were intent, for competitive reasons, on offering better concrete than the generally irregular product mixed at the job, they naturally looked to uniform proportioning of batches as a step toward improvement; and the method to obtain that uniformity was the weighing of aggregates. Very quickly the weighing of aggregates became the regular procedure on all construction of any consequence. A spectacular improvement resulted in quality and uniformity of concrete on important work. For instance, in one large city the average strength of paving concrete was approximately doubled within 3 years after weighing was required.

As experience with the more uniform concrete grew and confidence in the strength of well-controlled concrete became established, it was natural that the thinking of both users and producers turned to "guaranteed strength" as a basis for specification of quality. Also in the case of the experienced ready-mix producer the knowledge of results with the materials being used placed such production in a favored position. As a result many operators undertook to offer "strength concrete", and many specifications now provide for securing concrete on that basis.

Provided that an average strength without excessive deviations can be furnished, there is no question as to the economy of strength concrete. Many structural designers desire an average strength of at least 2,500 p.s.i.; they have found that 1-2-4 with typical materials will produce that strength or higher. But 1-2-4 requires 5¼ to 5½ bags of cement per cu. yd.; a 2,500-lb. average can usually be obtained with 4½ to 4¾

bags of cement per yard. Why pay for strength not considered in the design? In a competitive market this difference of at least ½ bag of cement is important in establishing prices for concrete. Many ready-mix producers will quote a lower price for strength concrete than for a mix having the proportions or the cement content which the designer considers equivalent to the strength basis.

However, even with the greatest care in obtaining aggregates of uniform grading and with good plant control in measuring materials, a substantial variation in strength of successive batches must be anticipated. It is only good judgment for a producer to include in his proposal for furnishing concrete on a strength basis some provision which recognizes this variation; to undertake a positive guarantee that no test will fall below a specified strength may result in dire trouble unless the mix contains an over-design of cement content.

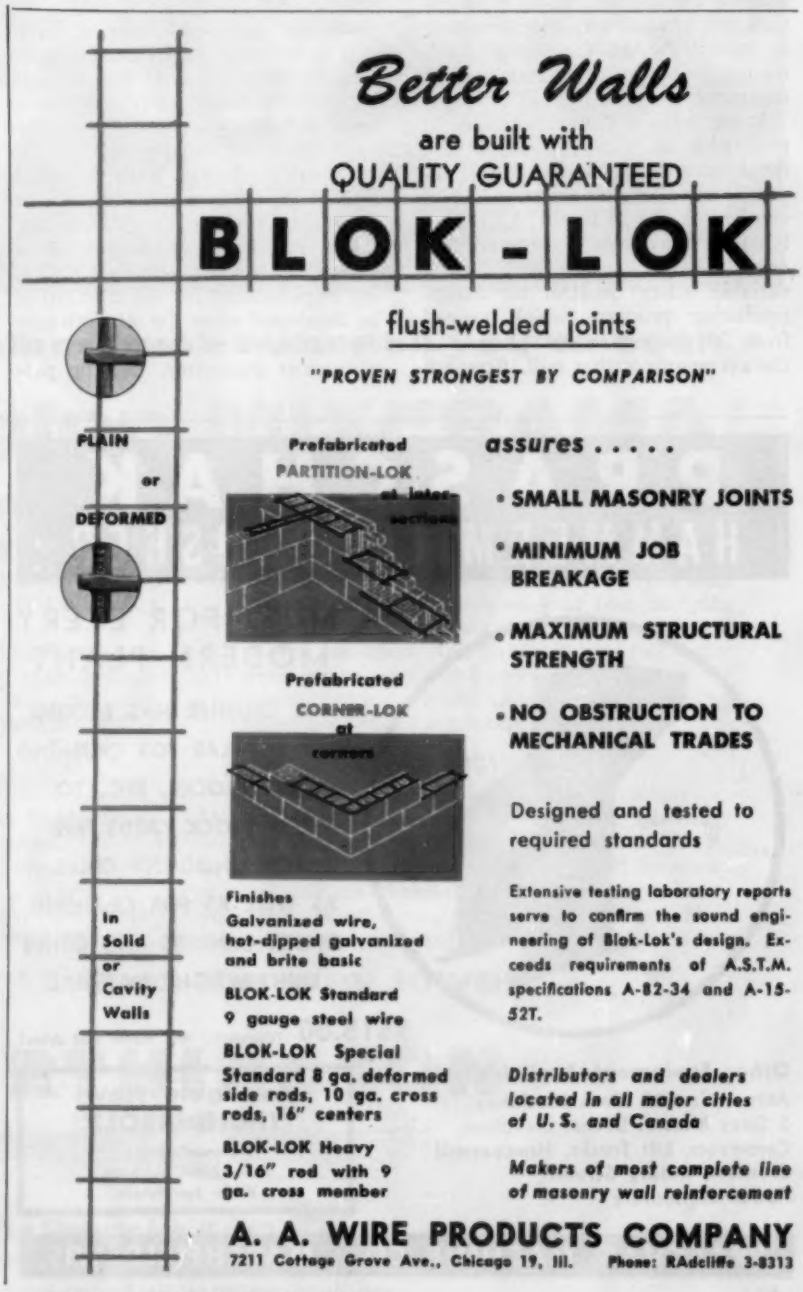
Shortly after strength specifications were proposed, the Portland Cement Association suggested an over-design of at least 10 percent; that is, design for 2,750 p.s.i. to meet a 2,500 p.s.i. specification. Field experience has shown that this basis is not too liberal, even in well controlled plants. The current A.S.T.M. *Specification for Ready Mixed Concrete* (designation C94-54T) covers the anticipated variation in strength tests (each test to be an average of strengths of three specimens from a composite sample) in the following provision:

"Par. 15-d. To conform to the requirements of these specifications, the average of all of the strength tests representing each class of concrete, as well as the average of any five consecutive strength tests representing each class of concrete, shall be equal to or greater than the specified strength, and no strength test shall have an average value less than 80 percent of the specified strength."

This provision was adopted by the drafting committee after reviewing test records which were made available by a number of agencies whose mixing and testing techniques were considered very good. The protection for a commercial producer, as suggested above, can be obtained by including in the sales agreement a clause that the provisions of C94 shall apply.

At the recent convention of the N.R.M.C.A. at Miami, Fla., in a discussion on the subject of strength as a basis for acceptance of ready-mix, Stanton Walker, the association's director of engineering, pointed out that in the truck-mixer test two years ago, the coefficient of variation was about 10 percent in spite of the superior procedures for sampling and testing employed by the association's personnel. He commented that reports had shown that a well-controlled commercial ready-mix operation might expect a coefficient of variation of 12 percent and that a fair operation might have a coefficient of 15 percent. With the latter coefficient a 24 percent over-design would be required to insure that 9 out of 10 tests would not be lower than the specified strength.

Some of the variations in strength to be anticipated were shown in a recent release issued by N.R.M.C.A. which summarized the strengths observed in various investigations in the association's laboratory over a period of 6 years. The "standard" concrete tested contained 5½ bags of cement per cu. yd., was now air-entraining, and had a slump of 3 to 4 in. For one group of six series (with three or more batches in each series) all mixed with the same blend

of five cements, the 28-day strengths ranged from 4,810 to 5,590 p.s.i. Other groups mixed with other blends of cements showed substantially similar ranges of strengths.

The question may well be asked, "Why this range in strength of concrete having uniform composition?" The aggregates can be checked for uniformity of cleanliness and grading within narrow tolerances. The water used is a uniform product. Measurement of materials by weight can be accurate, and uniform from batch to batch. No significant change of temperature occurs between batches. But what about the cement, the ingredient which undergoes the chemical change resulting in strength? Are the strength-producing properties of a given cement constant?

With reference to variations in properties of cement, one of the speakers, a ready-mix producer, reported as follows at the recent convention of the N.R.M.C.A.: "One laboratory investigation showed that cement from a given mill had a variable water demand or slump-producing property which ranged from 38 percent to 151 percent of the average from that mill. Strength producing properties from a given mill were found to vary from 67 percent to 118 percent of the average for that mill. Consecutive cars drawn from the same silo were found to have significant differences."

Other producers have reported similar experiences as to variations in results with a given cement. Actually, in furnishing concrete on a strength basis the producer is assuming responsibility for the strength to be developed when the strength-producing ingredient does not carry an equivalent guarantee. As the producer quoted above remarked further, "Selling on a guaranteed strength basis admittedly is hazardous; the only protection lies in providing a healthy safety factor in the cement content of the mix design."

• Twelve of the Boston Sand & Gravel Company's ready-mix units lined up before the firm's Cambridge, Mass., yard. These 8-cu. yd. units, powered by 165-hp. Model HRB-600 or 180-hp. Model HRFB-600 Cummins diesels, log approximately 60,000 "motor" miles per year.

### Baltimore Concrete Concern To Make and Sell Rapidex

The Baltimore Concrete Plank Corporation, Baltimore, Md., has signed a license with the Rapidex Corporation, a Spickelmier industry of Indianapolis, Ind., to manufacture and sell Rapidex, it was announced jointly by Carl F. Spickelmier, president of Rapidex, and Wayne Hart, vice-president and general manager of the Baltimore corporation.

The Baltimore Concrete Plank Corporation will make and sell Rapidex for a four-state area encompassing eastern Pennsylvania, southern New Jersey, Delaware, and most of Maryland.

### T. L. Amis of Wamix, Inc., Heads R. M. C. Assn. of Texas

Thomas L. Amis, president of Wamix, Inc., Dallas concrete producers, was elected president of the Texas Ready Mixed Concrete Association at the organization's recent annual convention in Dallas.

Other officers named include the following: Alvin Kelso, Galveston, first vice-president, and J. T. Suggs, Freeport, second vice-president. New directors are Charles Marshall, Fort Worth; Dan Parker, Houston; Tom C. Foley, Wichita Falls; Watson Palmer, Harlingen.

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An announcement released by Shore Engineering, New York, N. Y., states that the firm has completed negotiations with a manufacturing corporation to arrange for the complete installation of high-pressure-steam curing systems which may be purchased on a deferred payment plan.


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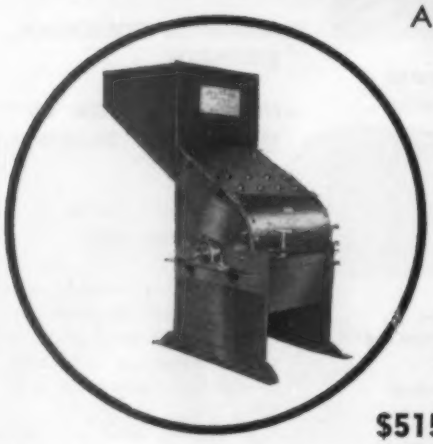

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2. You may attend a MIXERAMA in your area. The distributor will tell you where and when.

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Make arrangements today to see Worthington MIXERAMA — either working from your batching plant or from a Ready-Mix plant in your area. You'll be glad you did — almost as glad as you'll be when you can call one of these hardworking truck mixers your own. Worthington Corporation, Concrete Machinery Division, Section R.5.1, Plainfield, N. J. R.5.1.

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# Sound Reputation, Use of Ready-Mix Help Florida Firm Develop Volume Output of Concrete Septic Tanks

another ON THE SPOT report

ALTHOUGH the septic tank manufacturing business is generally thought of as one of the smaller branches of the concrete products field, we know at least one concern that has parlayed this comparatively obscure activity into a sizable enterprise. The company we have reference to is F. A. Johnson, Inc., of Fort Lauderdale, Fla. Although this firm does nothing except manufacture, service, and install concrete septic tanks, it employs 34 men on a year-'round basis, operates over 36 pieces of rolling equipment (including about 20 trucks), and pours over $50,000 worth of transit-mixed concrete per year.

Johnson's success in the septic tank business seems to bear out the axiom that even the smallest concrete products venture can grow under the stimuli of aggressive merchandising and a soundly based reputation for reliability. With these ingredients, plus a considerable talent for breaking the production bottlenecks that keep many similar ventures in constant jeopardy, the Johnson organization has increased its volume at a steady rate year after year. At present the company operates three plants in the Fort Lauderdale area, installs over 2,000 complete septic systems with drains in the course of a year, and carries a running inventory of some 250 precast tanks ranging in capacity from 500 to 1,200 gallons.

Plant facilities and personnel are at present geared to manufacture and install 12 to 14 tanks per day. Tanks are mass produced in sizes ranging from 540 to 1,215 gal., in increments of about 100 gal. Larger tanks up to 10,000-gal. capacity are cast on special order, using the tilt-up technique.

We were particularly intrigued to learn that Johnson uses purchased ready-mixed concrete in all its operations. Company officials admit that they can purchase raw materials and mix concrete cheaper than they can buy ready-mix, but their experience has been that this price advantage is *more* than wiped out by the cost of wheeling plant-mixed concrete to the septic tank forms.

During the period when the company did its own batching and mixing it was found to be almost impossible to maintain any acceptable degree of uniformity from batch to batch. The help either wasted cement lavishly or used far too little, with the result that consecutive batches might show strengths as high as 4,000 p.s.i. and as low as 1,500 p.s.i. While it was recognized that better supervision would improve matters, the net economy of ready-mixed concrete looked promising enough on paper to justify a trial.

When all three plants are in operation, Johnson often pours as much as 20 cu. yd. of concrete in a single day. Waiting time is something of a problem, for even with the most careful preparations a run of 540-gal. tanks may necessitate holding a truck for as long as two hours. Since the ready-mix trucks are all equipped with 2-way radio, it is always possible to obtain additional concrete at any of the plant sites without interrupting manufacturing operations.

From a technical point of view the manufacture of the septic tanks is a comparatively simple operation —so simple, indeed, as to be somewhat misleading. Six-bag 3,000 p.s.i. concrete, with a top aggregate (native oolitic limestone) size of ¾ in., is used for all pours. The all-steel forms were designed and built by Johnson, and incorporate steel-bar truss work which makes for exceptional rigidity.

Before the forms are assembled, a coating of crank case drainings is applied to the casting surfaces with calcimine brushes to facilitate stripping. Some conception of the scale of the operation is indicated by the fact that this relatively crude operation consumes 250 gal. of oil per month.

High-discharge transit-mix trucks are used exclusively, so that the concrete can be chuted directly into the forms. Steel is placed as the pour progresses, and the concrete is thoroughly rodded to eliminate voids. Each set of forms is poured once every two days. The tanks are kept wet for several days after stripping, and yard inventories are kept at sufficiently high levels so that there is always ample time for thorough curing before delivery.

Side walls for tilt-up septic tanks are poured on a slab at one of the

Aerial view of one of F. A. Johnson's three plants at Fort Lauderdale, Fla., for the production of precast concrete septic tanks.

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Left: This company has found the overall economy of ready-mixed concrete much better than job-mixed material, plus the important advantage of improved quality control. A tank of this size (540 gal.) can be poured in about 15 minutes.

plants and transported to the site, where they are placed on a cast-in-place base. Sides and ends are set up by means of a Schield-Bantam crane, and projecting ends of horizontal reinforcing steel are welded together to form strong, rigid corners. Finally the corners are enclosed with form work and filled with concrete.

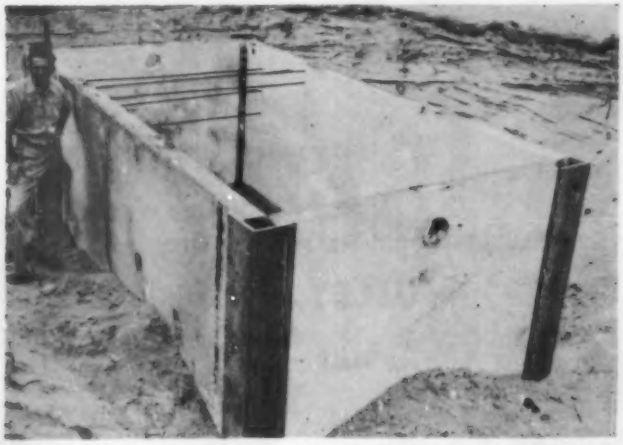
Johnson's real contribution to the septic tank business shows up most plainly in connection with the company's installation operations. Early in the game the firm's management spotted the job of digging holes as a serious bottleneck, as well as a major cause of labor trouble. Cranes and backhoes were soon purchased to eliminate hand labor, with the result that today site preparation is one of the smaller problems, and blasting activity (once pretty common) has become a rarity.

Similarly, the company found in its early operations that it was a mistake to shift men from one phase of installation work to another. Efficiency increased at every stage of the operation as soon as crews were thoroughly trained in a specific job, and they kept at it as much of the time as possible.

Excavation is done by one man, using either a clamshell crane (for sand), or a backhoe (if coral rock is present). A two-man rigging crew then delivers the tank and places it

Above: One of several service trucks owned and operated by Johnson. Careful attention to this important phase of the septic tank business is one of the primary reasons for the firm's success.

Below: Cast in flat panels and assembled on the job, this tilt-up tank has a liquid capacity of 3,000 gal. Corners are poured after the panels have been put together.



Right: This backhoe helped break one of the most serious bottlenecks in connection with the installation of septic tanks.

in the hole, using a special flatbed truck with a monorail hoist suspended from "A" frames. Finally an installation crew, consisting of either two or three men, takes over to level the tank, set the outlets, and pour the bottom. This same crew returns later to make a final inspection of the work and do the backfilling.

Johnson also does an extensive service business, and some part of the company's extraordinary growth must surely be attributed to the fine reputation it has built in this phase of its operations. Two 3-man crews are on call at all times for trouble shooting and pump-out work, while other crews take care of general repairs, lid replacements, and similar activities. Due to the high water table throughout the Fort Lauderdale area, practically all new residential developments are wholly dependent upon septic tanks, and thus a firm that builds a reputation for fast, dependable service is bound to attract favorable attention.

An example of the value that the Johnson organization places on its reputation is to be found in the story of how the company branched out into the paving business some years ago. Many of the septic tank installations necessitated excavating surfaced areas, and some of the regular paving contractors who resurfaced after Johnson's work was completed persisted in turning out third-rate jobs.

The customers who were the victims of such shoddy workmanship were prone to blame the Johnson organization rather than the paving contractor, with the result that much of the potential good will fostered by conscientious work on their own specialty was lost as a result of poor work done by others. After a few unsuccessful attempts to make the careless paving contractors see the error of their ways, Johnson said, in effect, "To blazes with 'em!" and proceeded to establish its own paving business.

Despite the company's history of steady growth, there has been no tendency to rest on laurels already won. Currently the firm is spending $6,000 to $7,000 annually for research and development work to improve the quality and lower the costs of its product. When and if better and less costly septic tanks can be produced and installed, Johnson means to be the first concern in the field to do so.

## Built-in Color Featured In Precast Wall Panels Developed by Marietta

A newly-developed precast insulated concrete wall panel with a colored exposed aggregate stone facing cast integrally with the panel has been announced by the Marietta Concrete Corporation, Marietta, Ohio.

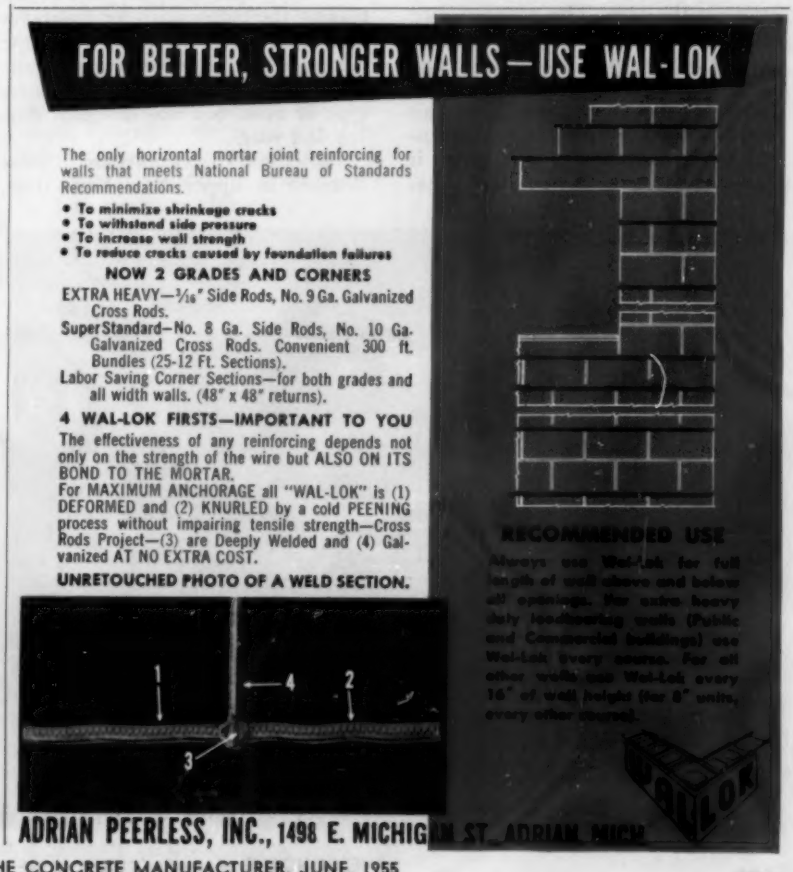
This Marietta product combines the appearance of expensive stone facing with speedy and economical panel curtain-wall construction. The method for producing the panels was developed by Marietta with the help and co-operation of the John J. Earley Studios of Rosslyn, Va., originators of the concept of plastic mosaic architectural concrete units. The Earley Studios have supplied functional and decorative mosaic and wall panels for governmental, memorial, commercial, and religious structures since 1915.

These panels are available in a wide variety of color combinations and surface textures, from a coarse to a highly-polished mirrorlike finish. The exposed aggregates, which may be quartz, granite, or even ceramics or vitreous enamels, are imbedded in white or colored cement matrix. All basic sizes and modules used in industrial and commercial construction can be furnished, and special sizes are also available.

Since the panels are cast with metal inserts which bolt directly to the building framework, expensive and time-consuming masonry work is eliminated. Specially designed tongue-and-groove joints insure complete water tightness; and thermal efficiency is such that no "backing up" is necessary. A rigid 1½-in. sheet of insulation forms the core of the panel.

Colored Marietta exposed aggregate panels are produced in quantity on modern production lines at Marietta, Ohio, and also at Baltimore, Md., where a $100,000 panel plant with a work area of 10,000 sq. ft. was completed formerly.

Precast concrete wall panels with exposed aggregate finishes are said to allow the architect and the engineer new freedom of design by permitting complete control over the size, shape, pattern, and texture of the components which cover the structure. They are functional, decorative, and easy to handle; and they enhance the appearance of any structure.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## Adapting Products Equipment To Area's Changing Needs—

# Pioneer N. Y. Block Firm's Formula for Success

THE Schenectady Cast Stone Company of Schenectady, N. Y., was founded in 1913, and was a pioneer producer of concrete blocks in that area. Over the years other block companies have grown

**By FITZGERALD C. SMITH**

up in the region, and in this competitive field the operators of Schenectady Cast Stone, as well as others, have used the latest and best equipment in meeting the competition.

This highly competitive situation has changed the size of one of the most widely used concrete masonry units in the area. The nominal face size of the most popular block was for many years 8 by 16 in. Then one of the firms produced an 8- by 18-in. block for the same price. This unit was gradually adopted by the designers and contractors, and today it is standard in the Schenectady area.

In meeting local competition Schenectady Cast Stone has used a variety of block machines in its 42-year history. The firm first used a powered 24 Zagelmeyer, adding (in 1931) an Anchor tamper. A No. 9 Joltcrete machine was installed in 1935, and later another No. 9 Joltcrete was added. In 1950 the company purchased its first GoCorp Senior model. Production now averages over 1,000,000 units a year.

By using a special GoCorp-designed mold on their high-speed, three-at-a-time GoCorp Senior block machine, the company has been able to increase production of tapered batter units from 200 to 4,000 per eight-hour day. The company first began making the batter units for manholes and catch basins in 1926. The same laborious and time-consuming casting methods were used until the new type of mold box was designed during last year.

Batter and barrel units are in great demand in upper New York state, and the company has been filling orders for the unit outside its normal territory. One order was delivered to the Rome State School, nearly 100 miles from the plant.

The special mold solves the basic problem of stripping without a separate operation. This is made possible by a series of hinges. The GoCorp Senior has an under-the-machine pallet return, and as the pallet rises to the batter block mold, it pushes the hinged plates into position until the pallet is released. The new type of mold enables the batter block, in spite of its unwieldly shape, to be turned out at the same rate as regular units.

The GoCorp mold produces a batter and barrel block that is 7⅝ in. high and 6 in. thick; average weight is 45 lb. The barrel unit has a 3-in. keyway, a 13½-in. inner wall, a 17-in. outer wall, and ⅜-in. mortar joints. The same mold produces the four sizes of batter blocks marketed by the company. It takes from an

One approach presents this view of the Schenectady Cast Stone Company's plant at Schenectady, N. Y.

Walter H. Leubner, assistant manager, inspecting a manhole model.

Gridley A. Becker, manager, John H. Moore, superintendent, and Walter H. Leubner, assistant manager.

hour to two hours to convert the mold from one size to another.

The batter mold can be adapted to making 48-, 42-, 36-, 30-, and 24-in. manholes. The 6-in. change in diameter is made by reducing the number of batter blocks. For example, 11 batter blocks form a course of units which reduces the ring diameter from 48 to 42 in., 10 blocks reduce the diameter to 36 in., 9 blocks to 30 in., and 8 blocks to 24 in. A 6-ft. manhole with a 24-in. diameter uses 38 batter units and 55 barrel blocks, while one with a 12-ft. depth with a 24-in. diameter uses 38 batter units with 154 barrel blocks. About 5,000 barrel blocks can be turned out in eight hours.

The plant has about 250,000 units on hand in its storage yard, covering a wide variety of sizes and types. As an example, production of the nominal size 8- by 18-in. unit includes a solid block with a 2-, 3-, 4- and 8-in. width, in addition to a 4- by 18-in. half-weight unit with a 4- and an 8-in. width. The company also carries specials such as corners, grooves, jamb block and bullnose units. A Truax block splitter is used to make split blocks in both natural and colored finishes.

A railroad spur services the plant, and cement and cinders are purchased in car lots. The cinders are bought from the H. Hessey Miller Company in Chester, Pa. These are high-quality cinders from thoroughly processed hard coal. Bulk, air-entrained cement comes from the North American Cement Company at Howes Cave, N. Y. A screw conveyor unloads the cement from the hopper car into a Butler elevator, which carries it up 85 ft. for storage in a 565-bbl. Butler bin. The aggregate is moved in an adjoining Butler bucket-type elevator and stored in three aggregate bins. After the cement and aggregate is weighed, the batch is mixed in a 50-cu. ft. capacity Stearns mixer.

To speed its delivery service, the company uses an Anthony hydraulic block body on an International truck, along with three other regular International delivery trucks. The blocks are loaded by a Clark forklift, using no pallets. The entire truck load is then bound together by a cable and corner posts with a load binder. When the truck reaches the unloading site, the driver pulls out retractable steel prongs at the end of the body. Then the body is tipped, and the rear end comes within 3 to 4 in. of the ground before the load begins to slide. When the end of the body touches the ground, an additional tipping angle is provided by a second floating hinge which raises up out of the subframe, allowing the hoist to continue lifting.

As the driver feels the load sliding off, he moves the truck forward, pulling out from under the load with the aid of built-in rollers at the end of the body. The steel spring prongs also ease the load off as the truck pulls out. Thus, in a few minutes, the load is deposited in a neat pile. Manual unloading would require an hour or more.

Another plant improvement now being installed is a new Kewanee 60-hp. oil-fired boiler. In addition to producing live steam for the curing rooms, the boiler will also generate dry heat, which will be piped into the plant's six curing rooms to remove moisture from the blocks. This system will cut down on the time that the blocks are left outside for curing, especially when they are needed immediately on a rush job.

In addition to the Clark fork-lift truck, the plant also uses two Erickson lift trucks and a Hyster. A Caterpillar Traxcavator is used to work around the cinder stockpile. The plant is managed by Gridley H. Becker, with the assistance of W. H. Leubner. John H. Moore is foreman.

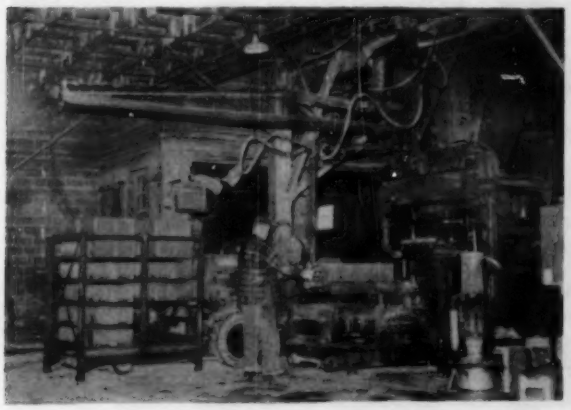
## Duluth Slag Company Plant Acquired by Waylite Co.

Purchase of the Duluth Slag Company's plant in West Duluth, Minn., by the Waylite Company of Chicago was announced recently. Waylite, which produces lightweight aggregate for concrete masonry block, is now installing new equipment, estimated to have cost around $500,000, in the plant. The newly-acquired facilities are located on the property of the Interlake Iron Corporation.

Slag from the Interlake Iron Corporation will be used in the manufacture of Waylite, which produces block with high insulation and acoustic qualities. Because of its lightness such block also cuts labor and handling costs.

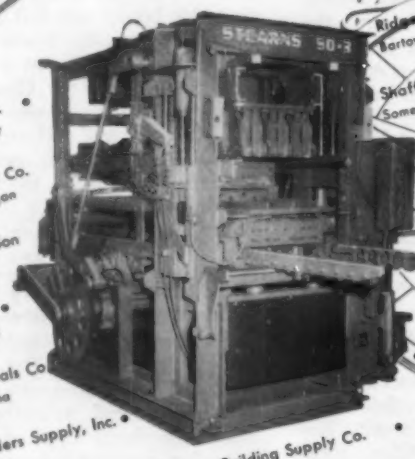
Zenith Concrete Products Company, Duluth, has been appointed manufacturing agent for Waylite products in the area. This firm is building a new plant adjacent to the structure purchased by Waylite. Officials of Zenith stated that the company plans to add concrete pipe to its line of products.

In this section of the plant block machines produce a total of 5,000 units per day.



This truck, with its special device for tilting and releasing the units, speeds unloading.

# Coast to Coast...




Henry Condo, Inc. • Raritan, New Jersey
• Tru-Bilt Block Co. Pontiac, Michigan
Joseph Metz & Son Lyons, Illinois
• A. P. B. M. • Lubbock, Texas
Muskogee Materials Co Muskogee, Oklahoma
Three Rivers Builders Supply, Inc. • Three Rivers, Michigan
Fendt Builders Supply Company • Farmington, Michigan
Concrete Building Products Co. • Harrisonville, Missouri
Concrete Building Supply Co. • Plattsburgh, New York
Masonry Products Co., Inc. • Garden City, Kansas
Harvey Cement Products Co. • Harvey, Illinois
Sheffield Coal & Supply Co. • Hammond, Indiana
Frazen Block & Material Corp. • Indianapolis, Indiana
Larson Brothers Sand & Gravel Co. • Rockford, Illinois
Pressur-Crete, Ltd. • Manitoba, Canada
Brighton Cement Products Co. • Brighton, Michigan
Shaffer Block Works • Somerset, Pa.
Rider Concrete • Bartow, Florida
Chrystalite Tile Co. • Roseburg, Oregon
Featherlite Corp. • Austin, Texas
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Al's Construction Co. • Pierre, South Dakota
Stewart Masonry Supply • Redding, Calif.
Chicks Block Company • Gibbsboro, New Jersey
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## DELIVER MORE AND BETTER BLOCKS PER DOLLAR!

In *every* state—almost *every* city—*wherever concrete blocks are produced,* Stearns block making machines are turning out more, and better blocks per dollar. High quality blocks, at low production cost are the result of Stearns many exclusive features—long experience in the building of *better* block machines. Completely automatic to provide simple, one man operation, Stearns durable, massive construction assures long life, low maintenance.

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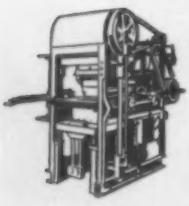
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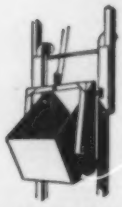
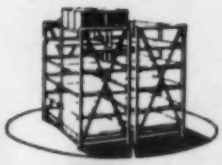
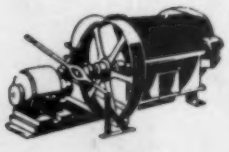

SKIP LOADERS


TURNTABLES


MIXERS

**COMPLETE CONCRETE PRODUCTS PLANT EQUIPMENT • STANDARD OF THE INDUSTRY**

# New ready-mixed concrete plant of Cleveland Builders Supply features

# Electronic Batching Control

By ROY L. PECK

another ON THE SPOT report

TUCKED into a strategic 3.2-acre site on the Cuyahoga River in central Cleveland, the new ready-mixed concrete plant of the Cleveland Builders Supply Company recently began producing at the rate of 200 cu. yd. an hour, which reputedly makes it the largest commercial installation of its kind in the country. Equipped with every modern device for the control of each operation—from the delivery of basic materials in self-unloading boats to the finished concrete supplied in a fleet of shining truck mixers—the plant represents a workable solution to the problem the company faced a year or so ago.

It was then that the city condemned the firm's 16-acre lake front property and dock for the purpose of expanding the freeway drives and also took over a river plant site in connection with the river widening project. This action forced C.B.S. to look for a centrally-located site which would provide the essential elements for unhampered production in the future. As a corollary to the restrictions imposed by the limited area of the only available river site, it was decided that automation must compensate for the lack of space in every possible detail of the operation. Complete electronic control of the batching process, the heart of the plant design, formed the nucleus around which other operational functions were fitted.

Since the Cuyahoga River forms the eastern boundary of the new

Aerial view of the new ready-mixed concrete plant of the Cleveland Builders Supply Company, Cleveland, Ohio, showing the "Charles Dick," a material carrier discharging lake concrete sand into stockpiles.

property, no change was necessary in delivery of aggregates. Crushed stone, constituting the larger part of the coarse aggregate used for the concrete, is dolomitic limestone, and comes from Drummond Island, St. Mary's River, Mich. It is transported from that source to the C.B.S. dock in self-unloading freighters, equipped with 200-ft. long conveyors which discharge their 11,000-ton loads at the rate of 2,000 t.p.h. to the plant's aggregate storage areas. Sand for fine aggregate comes *via* Lake Erie, either from Pelee Island or Erie, Pa., in vessels similarly equipped for quick unloading.

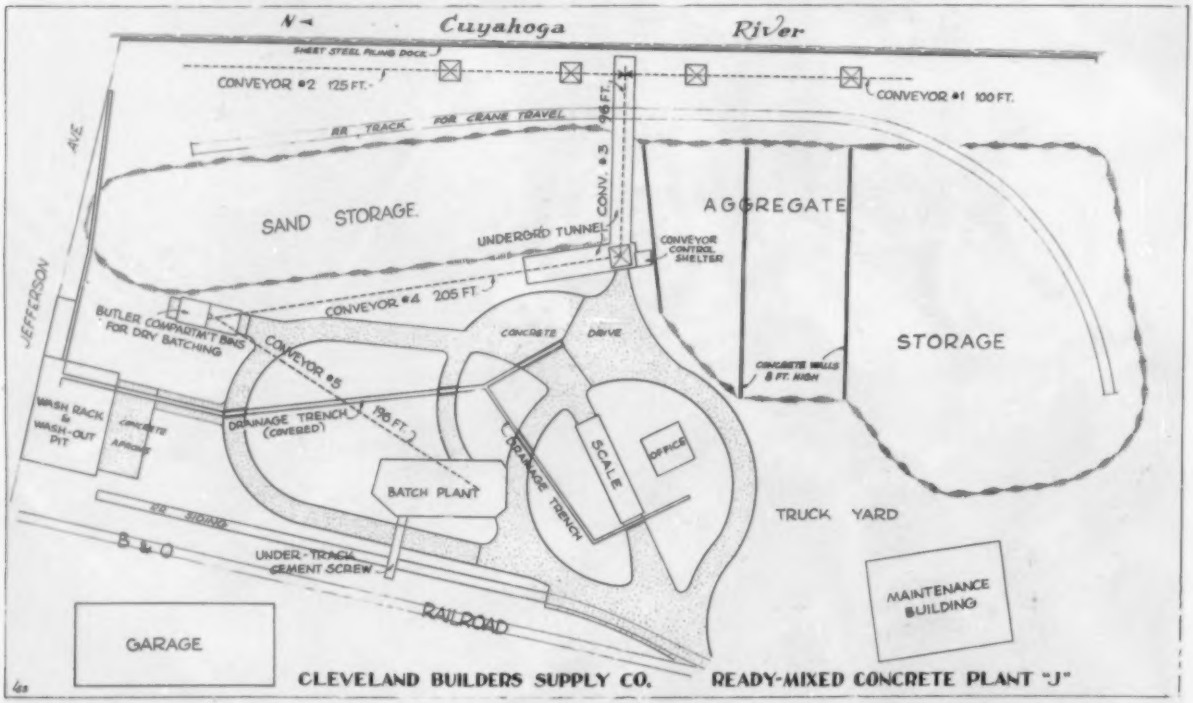
Thirty percent of the aggregate now used is hard blast-furnace slag, procured from either of two local sources, the Republic Steel Company or the furnaces of the American Steel and Wire Company, both located within easy trucking distance of the plant. Cement is received in bulk railroad cars or trucks, these discharging into an under-track hopper beside the batching plant. Some Haydite lightweight aggregate is used, coming from the South Park, Ohio, plant of the Hydraulic Press Block Company. Lightweight concrete is increasingly more in demand for floor or roof fill construction.

The design of the plant, so far as movement and proportioning of materials is concerned, is a development of the Butler Bin Company, Waukesha, Wis., and the Electronics Division of the Fairbanks-Morse Company, Chicago, a pioneer in the electronics field. The first Butler XKI electronic batcher ever manufactured was installed in the C.B.S. plant to provide the economy, accuracy, flexibility, sensitivity and speed required in this modern plant. The overall design of the plant was carried out by Wilbur Watson Associates, consulting engineers, Cleveland, Ohio, and C.B.S. officials, whose long years of experience have given them keen insight into the specific details of the ready-mixed operation. Production of concrete without automatic control is being continued by the company in two other plants, offering a valuable comparison with the higher efficiency being attained in the new plant.

Left to right: Jay C. Ehle, vice-president; Ralph J. Reinhartz, superintendent; and C. Jack French, chief engineer of the ready-mixed concrete department.

As is shown on the layout sketch and in the aerial view of the plant, the movement of materials is perfectly co-ordinated within the limited confines of the site. Aggregate storage of 45,000 cu. yd. is built up in stockpiles at the south end of the property, and sand storage of 30,000 cu. yd. at the north end, by the discharge from the conveyors of the boats bringing in material. A McMyler locomotive crane, equipped with Cummins diesel power, and carrying a 1¾-cu. yd. bucket on a long boom, operates on a railroad track adjacent to the storage areas. It reclaims materials from the storage stockpiles and places them in any of the four Butler single-compartment bins which are set along the dock line. Temporarily, a Hough high-lift Payloader is being used to feed these bins; it will be permanently used for yard cleanup in the future.

As shown in the illustrations, these bins feed two belt conveyors traveling parallel to the dock line and discharging into a concrete collecting hopper set at the junction point of the conveyors. No. 1 conveyor in this setup is 100 ft. long and No. 2 is 125 ft. long. All belt conveyors in the plant, totalling over 750 ft. in length, were furnished by the Barber-

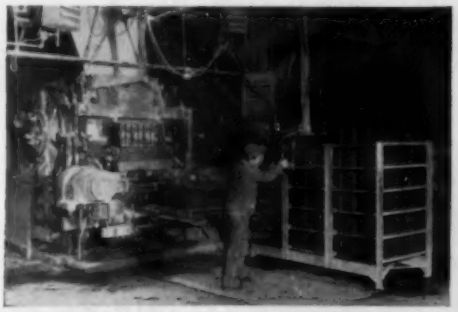



Layout of the new plant, which shows the compact co-ordination of operations, storage areas, drainage trenches, conveyors, paved traffic areas, and other features of the 200-cu.-yd.-per-hour production plant.

# Another BESSER Booster*

★ This is the 120th of a series of ads featuring leaders of the Concrete Products Industry who are stepping up block production with Besser Vibrapac machines.

Belot Concrete Block Company executives: (left to right) L. R. Roberts, Sec. and Treas.; J. R. Belot, President; Barney Cross, Plant Superintendent.



Besser VIBRAPAC in the Belot plant. Fully automatic. No machine operator is required. Off-bearer is transferring three 8 x 8 x 16 modular units to rack, ready for the curing room.

Cubing block at Belot plant. No manual lifting. Workman uses Besser Hoist with Combination Clamp for transferring block from rack to cube. Note turntable for rotating rack. Another Besser time-saver.

Ranch-type home built for Carl Bachman, a former U.S. Congressman. All masonry units are cinder block, produced in the Belot plant.

## The VIBRAPAC Produces the HIGHEST Number of QUALITY Block at the LOWEST Cost!

The Belot Concrete Block Company, Tiltonsville, Ohio, are old timers in the block business. Back in 1919, they produced block by hand, and it wasn't until 1941 that the company installed their first Besser machine, a Champion 16-12 model. Today, they operate a modern VIBRAPAC, with all speed-up improvements, including height and density control.

Why did Belot specify Besser equipment? In the words of President J. R. Belot: *"We wanted a machine that would produce the highest number of quality block at the lowest cost"*. The VIBRAPAC does all that and does it with a minimum of downtime.

Just stop to reflect for a moment. Can you think of any other block machine in the world that comes up to the high standards set by a Besser VIBRAPAC?

**BESSER COMPANY** • **Box 131, Alpena, Mich., U.S.A.**

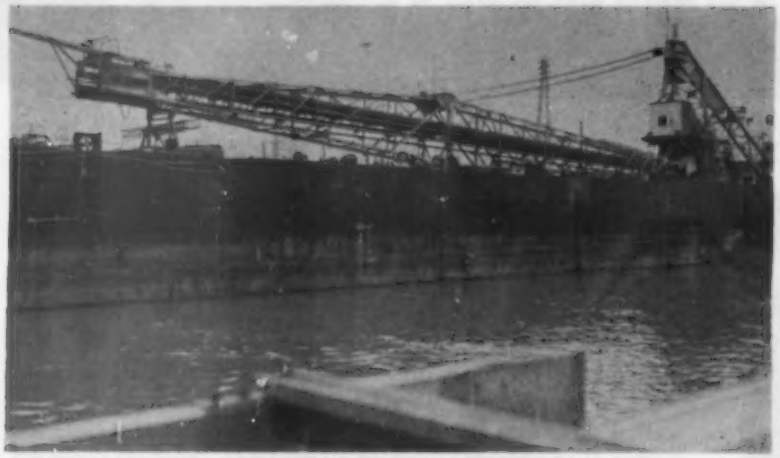
***Complete Equipment for Concrete Block Plants***

Aerial view of the spacious Belot plant. Note large stock piles of block in all types and sizes, including Soffit Floor Filler units and Bes-Stone Split Block.

BESSER

A 8359.1PBC

**World's Leading Manufacturer of Concrete Block Machinery**



The "John A. Snyder," a stone-aggregate carrier with 200-ft. discharging boom, which transports crushed stone to the C.B.S. ready-mixed concrete plant.

A view along dock line, showing the four collecting bins and two conveyors for feeding the main conveyor line.

Below: A tractor-loader filling a bin along the dock line. This use is temporary, the unit to be used later in yard clean-up.

Right: The 150-cu. yd. two-compartment bin for dry-batching. Sand storage is in the rear. The conveyor system from the collecting bins and to the top of the batching bins is shown at the right.

Greene Company, and all are 30 in. wide.

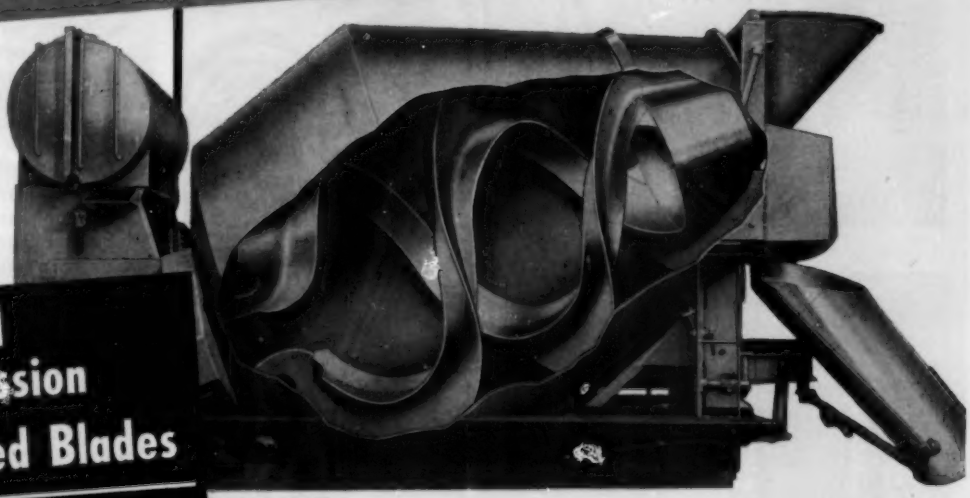
A cross conveyor, No. 3, 96 ft. long, operating in a tunnel, receives the dock hopper discharge of materials, which it carries to a concrete underground collecting hopper for the main conveyors. No. 4 conveyor, 205 ft. long, takes the materials fed to it from the hopper and raises these to the top of the 150-cu. yd. Butler two-compartment bin and weigh batcher used for dry-batching into trucks. A radial diversion spout diverts the flow into either of the two compartments of the bin.

Unless thus diverted at that point, the materials continue upward on conveyor No. 5, 196 ft. in length, to the top of the batching plant, 105 ft. above the ground. Here, a radial discharge spout empties materials into any one of the six compartments of the bin.

At the upper level of this plant, which is only 54 ft. by 30 ft. in plan area, are located the two storage bins — one a three-compartment, 3,000-bbl. capacity steel cement bin, and the other a six-compartment, 450-cu. yd. steel aggregate bin. Cement or other cementitious material is taken from the under-track or truck hopper by means of a Fuller cement screw and is carried up to the cement bin by a 110-ft. Butler cement elevator; or it can be pumped into a 4,000-bbl. standby bin by a Fuller-Kinyon cement pump.

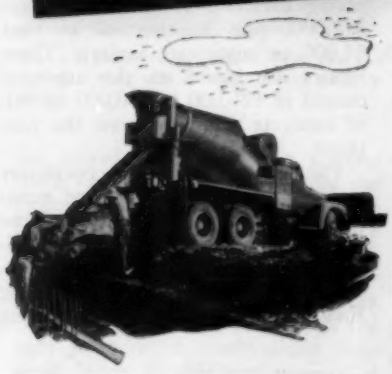
The automatically-operated weigh batchers for the measurement of aggregates and cement are on the level just below the storage bins. Here, too, are the water batcher and a 5-lb. (80-oz.) batcher for air-entraining

# SMITH
# DE LUXE TRUCK MIXERS



Cutaway view of the Smith De Luxe Truck Mixer drum. Note the patented "T"-shaped blades — the greatest improvement in mixing action ever put into a truck mixer drum.

**2-Speed Transmission**
**+ T-Shaped Blades**
**= Better Mixed Concrete**



## Want Quality Concrete... in a Hurry?

If you do, the Smith "concrete factory" with the PATENTED "T" SHAPED BLADES and 2-speed transmission, is your answer. In any inclined axis drum the heavy rock naturally rolls to the lowest point, and the fines will float. Smith has the *only* blade which counteracts this segregation. The mix is pulled to the big end of the drum, picked up, turned over, and poured into the center of the batch. True flow action takes place.

The 2-speed transmissions, standard on Smith mixers, give you the complete range of drum speeds needed regardless of the length of haul. You never need to undermix or overmix in a Smith . . . you have complete control.

The proof is in the concrete which you discharge from your Smith . . . the last shovelful out of the drum is exactly the same as the first shovelful. Call or write your nearby Smith dealer for complete detaiis.

**The T. L. SMITH CO., 2887 N. 32nd St., Milwaukee 10, Wis. U. S. A.**
*Affiliated with Essick Manufacturing Co., Los Angeles, California*

SMITH
THE T. L. SMITH CO. MILWAUKEE U.S.A.

*Builders of Better Mixers for More Than 50 Years*

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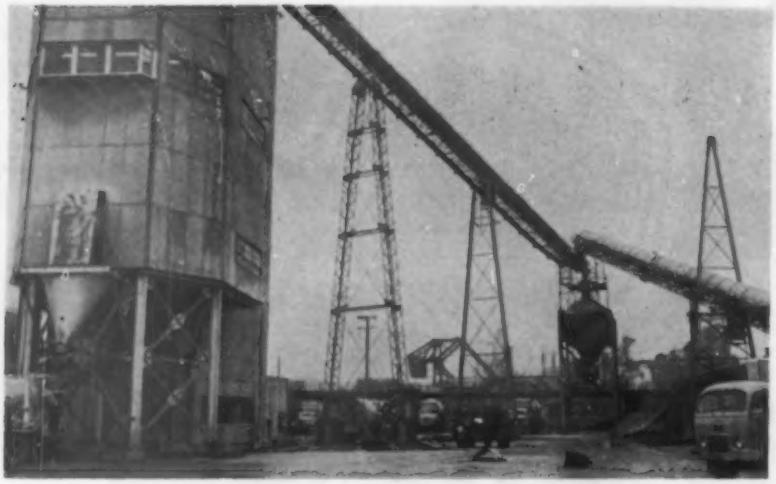
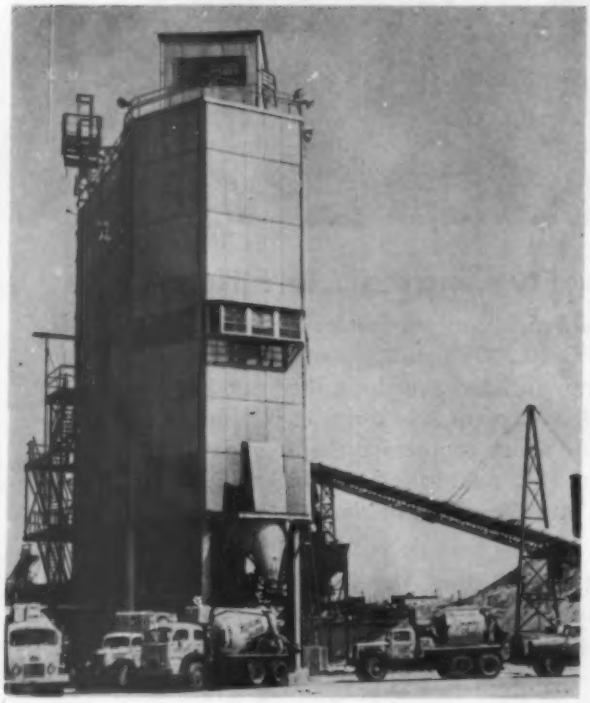




Above: Main conveyors No. 4 and 5, which bring aggregates from the dock past the dry-batch bin up to batching plant bins.

Left: The 105 ft. batching plant, showing the bay window of the operator's floor and a line of truck-mixers taking loads from the central plant mixer.

Below, left: One of the neatly painted C.B.S. truck-mixers receiving a load of concrete from the plant mixer.

Below, right: Operator's view downward from his position in the batching plant, through a glass window extension.

admixes. Cement coming down from the bin is moved horizontally to the weigh batcher by two cement screws. The operation of all feed mechanisms in the batch plant is tied into the automatic control, so that perfect synchronization results in proportioning and batching all ingredients of the concrete. The electronic control system also measures and compensates for the contained water in the aggregates. In addition, any moisture in the aggregate is also adjusted for the correlated percentage in that adjustment. In other words, it integrates successive increments of the adjustment.

In the conventional hand control of weighing materials, as followed in the other plants of the company, the deftness of the operator in closing off the flow of materials at the moment the weighing scales show the right amount determines the accuracy of proportioning and weighing. Variation is said to average as much as 25 lb. of cement over or short per 6-cu. yd. batch of concrete; it may vary even more in weighing coarse and fine aggregates.

With the new electronic control system the possible variation in cement content cannot exceed 4 lb., in aggregates 10 lb., and in water 6 lb. per batch. Such accuracy constitutes practically 100 percent control, and with it C.B.S. expects an annual savings dividend on cement of around $12,000, plus another of at least $4,000 on aggregate savings. These figures are based on the expected output of 125,000 to 150,000 cu. yd. of concrete annually from the new plant.

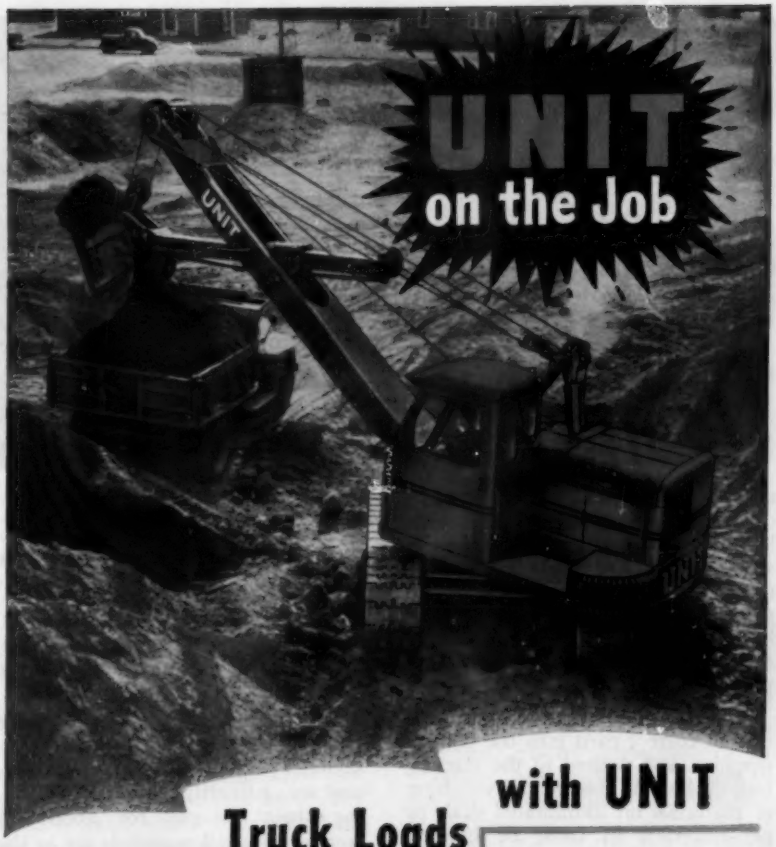
Far greater than these pecuniary savings, however, is the time economy resulting from the use of the system. Time is saved in the mechanical processes of determining proportions, weighing materials, introducing these into the mixer, and discharging

Receiving an order from main office on the teletypewriter machine. This shot also shows the dial of the outside truck scale.

The dispatcher can contact (via two-way radio) a truck unit enroute, or any point in plant.

the mixed batch into the waiting truck unit below. It is here that the electronic, instantaneous action is best apparent. On the operator's floor in the batching plant, 45 ft. above the ground, the operator receives advice *via* two-way radio from the dispatcher as to the details of the next mixture of ready-mixed concrete. Many possible combinations of aggregates, cement, and water, up to a total of perhaps 1,500 different mixes, to produce the required concrete consistency and strength, have been card-catalogued on punch cards filed within easy reach of this operator.

These cards, in fact, become the batching operator. The human element responsible for possible error has been removed. Further, there are no dials to set, no levers to pull, nothing to detract the man's attention from his one job of selecting the right card for the mix wanted. The electronic control unit instantly determines the type of ingredient, its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Here's a UNIT ¾ yard Shovel that's "in there swinging" . . . making big payloads. UNIT'S balanced stability and power permit hard digging . . . produce maximum yardage at low operating cost. Fewer working parts cut down replacements required . . . reduce maintenance costs. The FULL VISION CAB enables operator to see in ALL directions . . . promotes safety . . . increases efficiency. Results in more loads per day and easier load handling. Get the complete UNIT story. Write for literature.

**UNIT CRANE & SHOVEL CORPORATION**
6329 WEST BURNHAM STREET • MILWAUKEE 14, WISCONSIN, U. S. A.

½ or ¼ YARD EXCAVATORS...CRANES UP TO 20 TONS CAPACITY
CRAWLER OR MOBILE MODELS . . . GASOLINE OR DIESEL

All Models Convertible to ALL Attachments!

A 7312-¾-PC

Two views of the electronic batch control system in the operator's position in the batching plant. Note the pen-recorders for proportioning, and the dial scales for visual check of process.

desired weight, and the sequencing of the proportioning. Successive batching of the same combination is simply a matter of touching the starting button after each cycle. With the proper auxiliary equipment, bookkeeping, pricing, and invoicing could also be handled from the same punched card.

As soon as the operator has inserted the correct card into the control machine and pushed in the starting button, he can observe the weighing of materials on illuminated dials or pen-recorders in front of him to check further on the selection being made. The electronic control unit provides time and date stamp, relays, lights, pushbuttons and other related features. It has a positive lock which prevents accidental change of selection during batching. Since the graphic record indicates both the full and empty weight of the batcher, it is impossible for the operator to be unaware that a portion of the batch is hung up in discharging. The operator can look down through the glass panel of a projecting bay window at the discharge of the central mixer into the drum of the waiting truck below him.

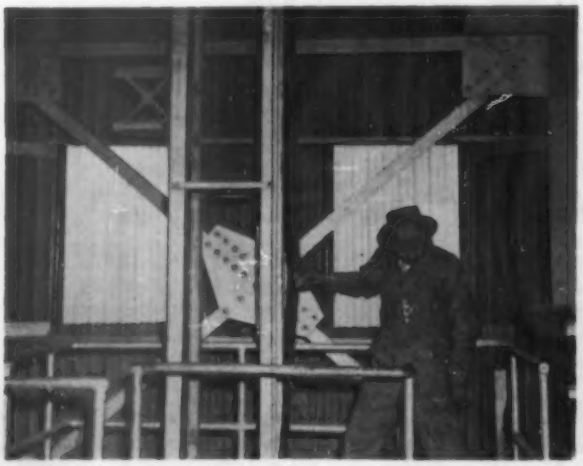
The materials and water have meanwhile gone down into this mixer, a 6-cu. yd. Smith tilting type, and are ordinarily mixed, for shrinking their volume, for about 15 seconds after all materials are in the drum. This time of mixing can automatically be varied, when so required, to produce a fully-mixed batch, which the truck unit below can keep agitated on the way to the job site. The aggregates, cement, and water can also be delivered into the truck mixer separately, to be transit-mixed en route to the job, or they can be dry-batched, without water.

All of these operations and choices are controlled by the electronic batching system. Even before the central mixer in the plant dumps its load and returns to mixing position, the next cycle can be started by the operator, thus keeping an uninterrupted flow of concrete through the system. The loading of the outside bins and conveyors must, of necessity, be synchronized with the speed of the automatic batching process.

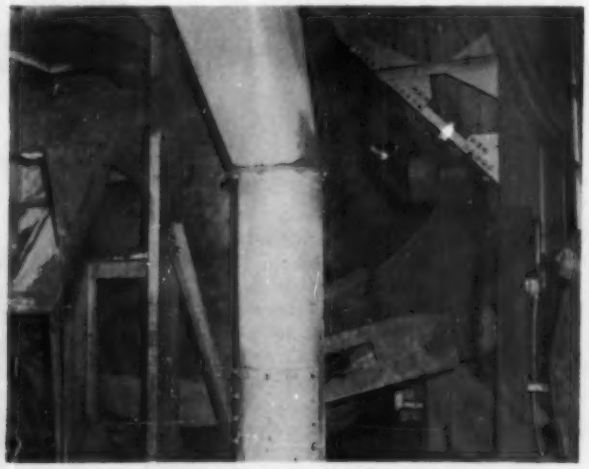
Typical of time-saving devices used throughout the plant is the elevator installed in the batching plant to enable personnel to move quickly up or down from various levels. One simply takes hold of the ascending (or descending) handhold, steps on the moving platform, and is whisked through a series of openings in each floor to the level he wishes. In fact, there is no manual labor at any point in the entire process which can be accomplished mechanically.

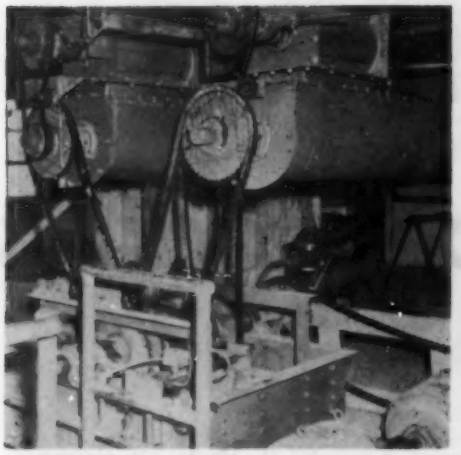
Orders for ready-mix concrete come into the general office of C.B.S. generally by telephone. These are immediately transmitted to the dispatcher at the plant *via* Teletypewriter to avoid any mistakes. Communications between the dispatcher and the operator in the batching

This "man-elevator" in the batching plant has just deposited a passenger at his stop.

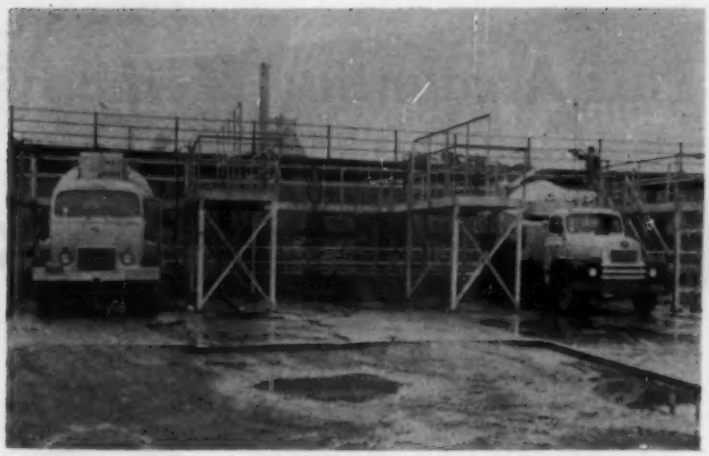


The tilting 6-cu. yd. central mixer in the batching plant in discharging position.





Two cement screws for moving cement horizontally from the bottom of the cement bin to the cement weigh batcher.



The three-unit, truck-mixer wash rack, which is equipped with a high-pressure hose for thorough cleaning.

plant are by means of a Telautograph. Orders written by the dispatcher are reproduced simultaneously on the operator's floor. The dispatcher, after checking truck mixer availability, contacts the operator, who sets the electronic system in action. The company now operates 35 Motorola two-way radio units. These are used for contact with key trucks and to keep in touch with job conditions or be informed of possible breakdowns. More units will be added in the near future. Several are distributed around the plant, where instant verbal contact is desirable to effect time-saving. It is the firm conviction of officials of the company that appreciable savings in time and money can be attributed to this radio system. For instance, the radio loud speaker directs the movement of trucks in the yard, and the speaker on the batching floor permits the operator there to direct the truck unit being loaded.

The 62-truck mixer fleet includes 20 Rex 5½-cu. yd., 15 Challenge 6-cu. yd., 12 Smith 5½-cu. yd., 10 Rex 4½-cu. yd., and 5 Jaeger 4½-cu. yd. units. The chassis used for these truck mixers comprise 22 White model 3000 cab-overs, 15 White 2264's, 13 Mack A50's, and 11 International 190's. Generally, 6-cu. yd. loads are carried, resulting in a 31,-500-lb. load on the rear-tandem axles of the truck, in accordance with the state highway limit for the wheelbases used.

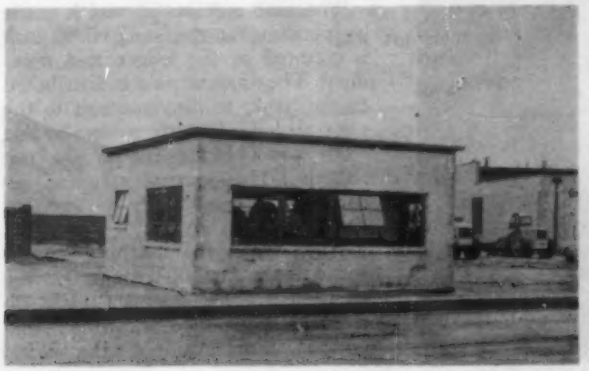
A system of drainage trenches (see the plant sketch) carries away any surface water which may collect on the grounds. Most of the areas used by the trucks have been paved with concrete, as well as the space around the wash racks and washout pit. Buildings other than the batching plant include the maintenance shop, the garage (outside the plant area), the dispatcher's office, and the scale pit. Concrete walls approximately 8 ft. high divide certain sections of the aggregate and sand storage areas. Cars of incoming materials can be easily spotted on a spur track leading into the plant area, over the track hopper next to the batching building. Although the railroad cuts across the only road outlet from the plant property, it is understood that mutual-interest agreements with this carrier lessens the possibility of any delay occurring while cars are being switched on that track.

Two Cleaver-Brooks 80-hp. boilers furnish steam to the plant; all piping was placed underground. A 1,000-gal. heat exchanger is used in connection with steam jets installed in the aggregate bins to eliminate any possibility of freezing of materials during winter operations. The entire batching building is enclosed and heat is provided to all structures on the site. In the three-unit-capacity wash racks, a high-pressure pump, made by the John Bean Manufacturing Company, Lansing, Mich., is used to boost the city water pressure up to 600 p.s.i., when it is necessary to use such pressure to remove hardened concrete from the truck mixers and other equipment. The fine condition of the fleet of truck mixers shows that C.B.S. management values the advertising potential of such "moving signboards."

The new plant represents an in-

*(Continued on page 207)*

Left: The dispatcher's office and the truck scale. Right: the truck yard and maintenance building (right), with stockpiles of aggregates (background).



# *This Accounting Method Puts*

# MONEY IN OUR POCKETS

By H. NORMAN SHUTE,
President
Shute Concrete Products, Inc.
Richmond, Ind.

another P-Q exclusive

ONE glance at the illustrations that go with this article may cause you to say, "We're too small for a bookkeeping machine," or "We have a machine."

In either case, this story is for you. *We're* "small", too, and we had a machine. But it was just a little posting machine and just another expense. We found out that a high-grade accounting machine will *pay for itself in this business.* Hard to believe, but I'll show you how we are paying for one on accounts receivable savings alone and getting a lot of extra benefits besides.

All who are in the concrete building units and building supply business know that working capital tends to "disappear" into accounts receivable. It does no good merely to know how much each customer owes. Even keeping customers' balances up to date on a daily basis does not help collections. The only thing that will keep total outstanding at the proper level is to know how much *each customer owes and the length of time he has owed it,* so that you can "get on" customers whose accounts are past due. And the longer an amount is past due, the stronger is the reminder to the customer.

Efficient dunning does not lose customers; they respect you for it. You either have a reputation for being an easy mark, or a businessman who is to be respected. It is amazing how quickly either reputation will "snowball."

Take a look at the illustration of forms shown in Figure 1. A step-by-step picture of the accounts receivable operation on the accounting machine (a National "Class 31") follows:

1. The charge sales slips are added and proved on a tape at the left side of the machine—and at the same time are analyzed by sales classification (storm sash, rails, awnings, doors, concrete products, and building materials). This analysis is made automatically simply by touching the right button as each amount is added. Whichever button is touched "adds into itself"—much like a cash register.

2. After proving a customer's slip or slips, the machine swings over to the ledger and statement. The operator picks up the old balance and the machine prints the date, total charge, and new balance automatically. The *overall* total of charges is, of course, accumulated while posting.

3. Now the old balance, if any, *for this month,* is picked up from the Arrears Column (without printing), and the machine prints the new balance of charges made *this month.*

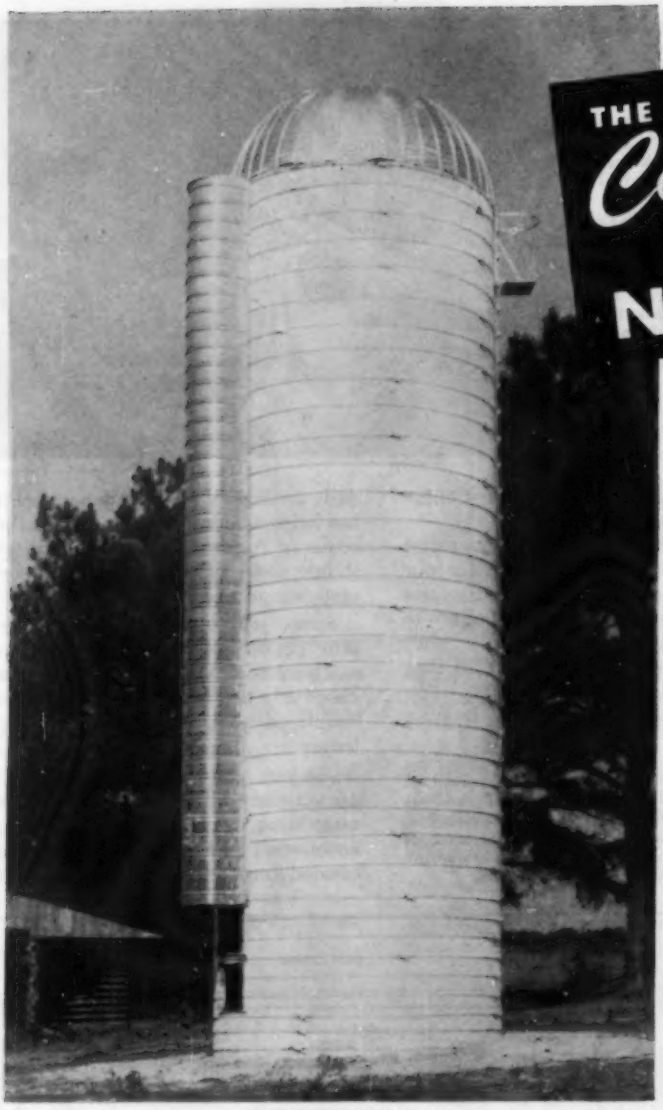
Cash sales slips are analyzed by the machine in the same manner, without, of course, being posted to any ledger card or statement. In this way, we get three daily sales reports as shown in Figure 2—one for charge sales, one for cash sales, and one for total sales. Notice that the machine prints today's departmental sales figures and then prints the departmental sales figures to date.

But the arrears analysis . . . how is that kept complete? Here is the other half of the story.

The cash receipts journal is made by machine at the same time cash is credited to the ledger and statement. The amount paid is distributed to the bank, to discount and to the general ledger, with a line-by-line ".00" proof of posting in the last column. The journal columns accumulate automatically as amounts are posted.

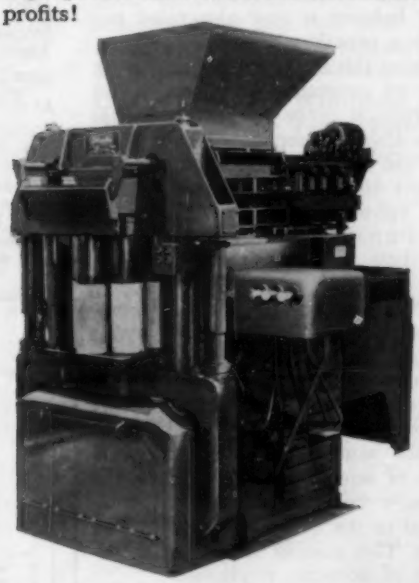
Now, when the machine gets to the Arrears Analysis column on the ledger card, the operator picks up the *oldest* balance shown in that column. For example, the oldest

The exterior of the Shute company's headquarters in Richmond, Ind., presents a prosperous, attractive view to customers.



# THE Columbia 12" HIGH OPENS UP A BRAND NEW MARKET

There's a big new market for concrete products waiting for the block maker who installs a Columbia 12"-High combination tile-and-block machine. It's the huge farm market, with growing demand for silo staves, drain tile and other products which can only be made on Columbia's 12"-High machines. Columbia gives you all these specialty items at high production rates for maximum profits!



## NOW... GET AUTOMATIC PRODUCTION OF SILO STAVES, DRAIN TILE!

Take a look at the beautiful tall silo above . . . built with Columbia's 12"-High concrete staves, securely locked with one steel band per course. Other special shapes which can be produced on the Columbia 12"-High machine include drain tile, water meter boxes, flue liners, Roman tile. We'll design molds for 12"-High modeled face block for any special building purpose!

Here's the famous Columbia 12"-High... a machine that can be teamed with any other concrete block equipment because of the small floor space required...a machine that, with a simple mold change, can produce either 12"-High specialty items or *all* standard 8" and 4" blocks. Electronically controlled, automatically operated.

**THE 12"-HIGH MAKES ALL THREE!**
In addition to special 12"-high shapes this great Columbia machine also makes all other standard block in 8" and 4" heights.

Write today for catalog describing Columbia's one, two or three-block machines, combination tile-and-block machines, block splitters, etc.

*District Offices In:* Wisconsin, Ohio, South Carolina, Mississippi, Florida, New Jersey, Virginia, California and Massachusetts.

**Columbia MACHINE**
Home Office: 107 S. GRAND, VANCOUVER, WASHINGTON
Factory Branch and Warehouse at Mukwanago, Wisconsin

amount shown might be August—$21.75. That amount is "picked up," although the machine does not print it. If the amount paid is *less* than $21.75, the machine will print the remainder still owed for August. Let's say the payment was $20; the machine would now print August—$1.75 in the Arrears Analysis column.

But if the amount paid were *more* than $21.75, the machine would *lock up* in the Arrears Analysis column. The operator would then pick up the *next* oldest balance—say September—$45. The machine would now automatically wipe out the entire August balance and reduce the September balance by whatever was left. For example, if the payment were $25, the machine would print September balance — $41.75. ($25 minus $21.75 August balance leaves $3.25; so the September balance is reduced by that amount.) The August balance is now also ruled out with a pencil.

From this explanation you can see that we automatically get an arrears analysis on every account, and that it is always completely up to date. We can look at a customer's account at any time and the Arrears Analysis column shows how much is due currently, how much is a month old, how much is two months old, and so on.

At the end of the month a complete analysis of *all* accounts is run off by machine. This is nothing more than a fast copying job from the ledger accounts—and it not only gives us an overall picture, but also at the same time proves that the sum of outstanding amounts in the Arrears column on each card is equal to the balance shown on that card. This analysis also is a trial balance of accounts receivable.

Since we adopted this system, overdue accounts have been reduced by thousands of dollars. I scarcely need mention that money usually costs about 5 percent at the bank, and that it is expensive to finance your customers. Because we have an Arrears Analysis on every customer, and are thus able to send reminders promptly, overdue outstanding is steadily being further reduced month by month.

Another advantage of the system is that statements go out *immediately* at the end of the month. There is no statement writing job to do, because all statements are kept up to date and in proof by machine, on a daily basis. It is true that many customers pay the first group of statements they receive and sometimes have to let the others go. If yours get there first, they are paid first!

All accounting work is done on a single machine which has removable control panels (form bars) at the front, which will change the machine from one function to another. The control panel can be seen just above the operator's right hand.

A third benefit lies in the fact that we are getting to be known for our collection policy. Some customers who might otherwise not bother to pay, remit promptly because they know we will "get on them" if they don't.

The fact that we now have a daily analysis of sales by departments has helped us in the operation of the business. As soon as one department shows signs of weakening, we investigate and correct the cause.

Space will not permit me to go into detail about the rest of our mechanized bookkeeping system. However, the forms we use for accounts payable, payroll, and general ledger are shown together in Figure 3. As you can see, vendors' invoices are vouchered by machine, and at the same time distributed to the proper accounts; the voucher register is created automatically as a by-product

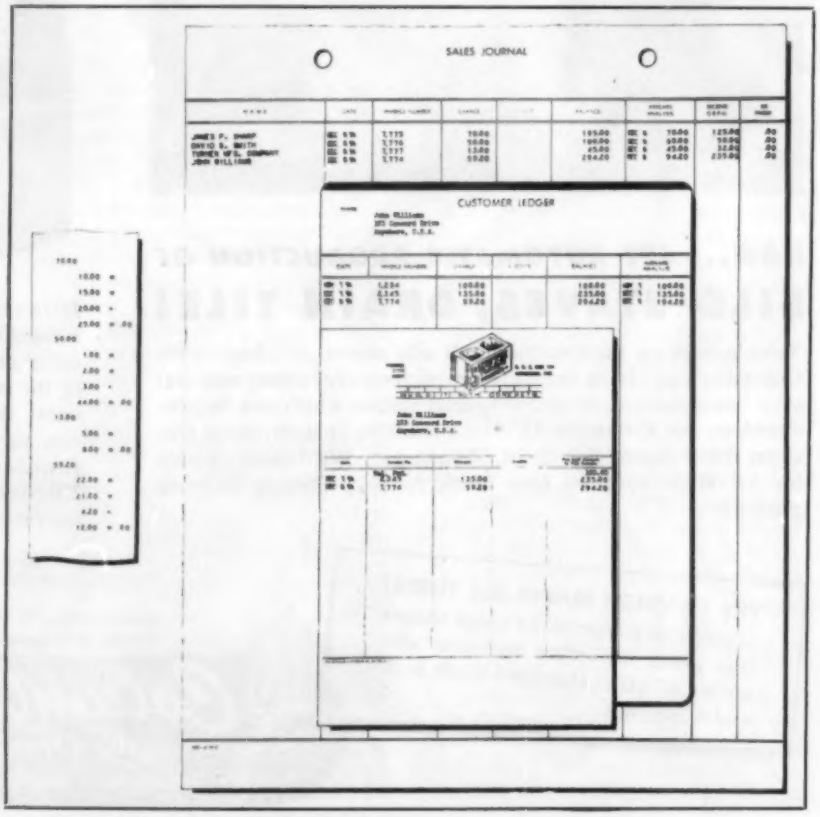



Fig. 1—As a part of the accounts receivable operation, charge sales slips are proved on a tape (at the left of the forms) and are at the same time analyzed by sales classification. The machine then prints the accounts receivable ledger, the customer's statement, and the sales journal automatically.

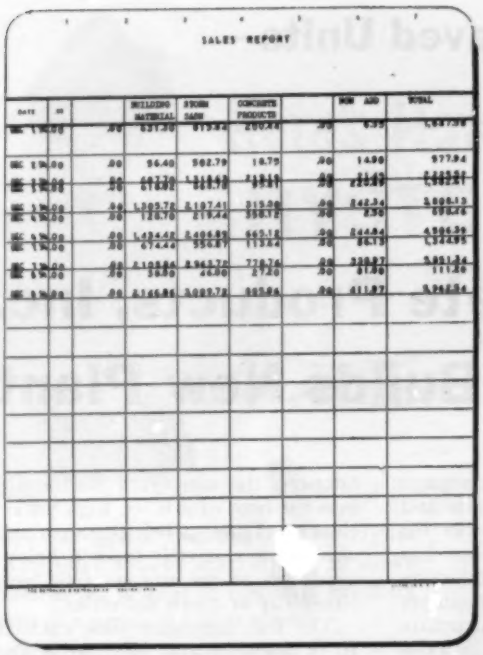



Fig. 2—The machine yields three daily sales reports like the one above—one for charge, one for cash, and one for the combined figures.

of this operation. When the checks are written, the check register is also an automatic by-product. The same journal is used in posting the general ledger, and the general ledger card is the same one that is used for distributing accounts payable merchandise and expenses.

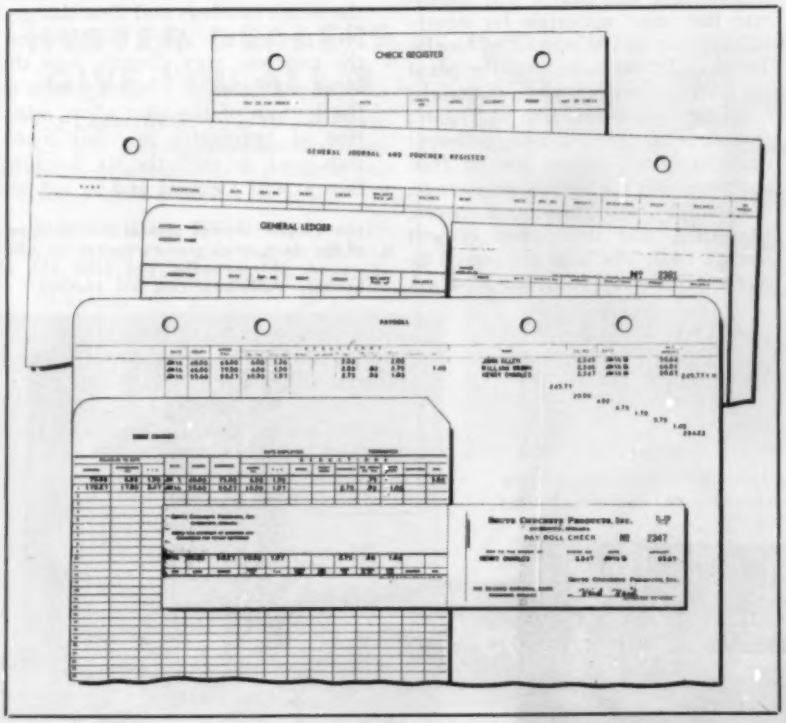
Mr. Shute has figures that are up to date, available at any time he wants them.

Glance at the payroll forms; note that the pay statement, check, earnings record, payroll journal, and check register are all processed at one writing. The machine automatically computes and prints gross and net pay, and also figures balances to date for earnings, withholding tax, and F.I.C.A. for each employee; these are automatically printed on the earnings record. Journal columns, including all the deduction columns, accumulate as posting takes place.

Machine methods save us time in three ways: (1) all related forms are made at one time, instead of having to be made separately as is done when the "pen-and-ink" method is used; (2) all records are kept up to date and in proof; (3) all adding, subtracting, and balance figuring is done automatically.

All of these things add up to one big result which is more important

Fig. 3—The payroll, general ledger, and accounts payable are other bookkeeping functions now mechanized on a single machine.



than any of them individually. We now get a profit-and-loss statement, not on the 15th or 20th or later, but a day or two after the end of the month. Nothing could be more important in this business. Therefore, it is doubly important to know what you are doing, right up to the minute. If you don't make it in the good nine months—well, you just hope for better luck next year. This machine puts money in our pockets.

## Concrete Blocks Withstand Atomic Blast at Yucca Flats

Pending a more complete report by authorities as to the effect of the atom blast of May 5 on masonry and other structures erected for test purposes at Yucca Flats, Nev., we wish to quote a few excerpts.

The official post spot release of the Industry Liasion Office of the Federal Civil Defense Administration on the performance of concrete block and precast concrete houses nearest (4,700 ft.) to any of the explosions stated:

"Both the one-story reinforced lightweight expanded-shale concrete block house and the one-story precast lightweight concrete house suffered only minor structural damage. . . . Both houses could be made habitable" . . . "The above ground portion of the two-story brick and cinder block house (same distance) was almost completely destroyed and the first floor system collapsed into the basement. None of the brick work remained standing, and the structure as a whole was beyond repair even for emergency shelter from the elements" . . . "The one-story frame rambler (same distance) was likewise almost completely destroyed. Only the reinforced concrete bathroom shelter remained intact."

In a subsequent issue we hope to present facts and photographs of this test to show the performance of concrete masonry and precast concrete slabs under the terrific stresses induced by the blast.

## Chicago To Get Its First Autoclaved Units—

# Precast Concrete Products, Inc. Builds New Plant

By ROY L. PECK

another ON THE SPOT report

OVER three decades ago Ben Lange started to make concrete blocks in the Chicago area. He was one of the first of the small group of producers who had faith in the future of the product, which was relatively little known to architects and builders. Today this pioneer of the industry is ready to operate his fourth plant. It will be the first in this area to furnish high-pressure-steam cured units in a market now dominated by concrete masonry.

Located on a 6-acre plot at Bridgeview, Ill., a Chicago suburb some ten miles to the southwest of Chicago's loop, the new Precast Concrete Products plant completes a strategic corner of a rectangular design of plant locations approximately 30 miles apart. This design blankets the city's southern, southeastern, and southwestern areas, which are destined to receive major industrial and subsequent residential expansion.

Products to be manufactured in the new plant include a complete line of concrete masonry units and precast joists and filler blocks for floor and roof systems. Space has been provided for future production of other integral concrete increments of the all-concrete structure foreseen by the experts. It is axiomatic in Mr. Lange's thinking that such comprehensive plans should include the latest tools for producing a high-quality unit and for delivering it into the hands of the mason in excellent condition. Such units will insure dry block and crack-proof wall construction.

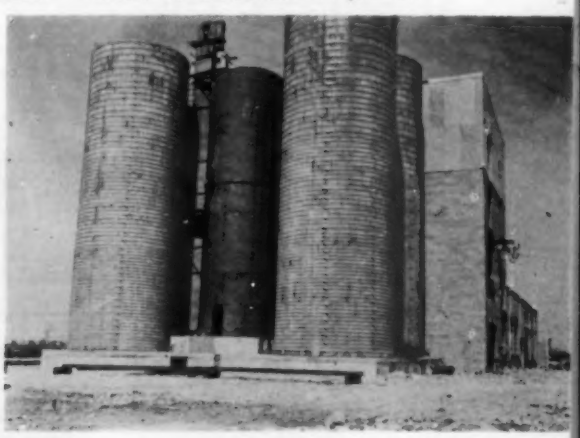
The physical setup of the plant, built adjacent to the Indiana Harbor Belt and B. & O.C.T. Railroads, includes for all practical purposes, two complete production lines. Lightweight aggregates will constitute the basic materials for nearly 100 percent of the output of blocks. These materials come into the plant *via* rail or truck. The materials-handling system for both aggregates and cement, furnished by different manufacturers, makes use of four concrete silos for aggregate storage, designed by the Marietta Concrete Company, and three steel cement storage silos. The silos are served by screw conveyors from under-track hoppers, the conveyors discharging into the boot of a 65-ft. high bucket elevator. Later, a belt conveyor will also carry materials from a below-grade pit to the storage silos from either car or truck deliveries.

The four aggregate silos, each 16 ft. in diameter and 50 ft. in height, afford 1,500 cu. yd. of aggregate storage. The three cement silos (two now installed), each 12 ft. in diameter and 45 ft. in height, hold 3,000 bbl. total cement storage. The four aggregate silos are quartered into compartments, thus providing for a variety of separate material storage.

In addition, there are six steel bins each of 30-cu. yd. capacity, set over two weigh batchers, which allows a combination of any of the six materials to be introduced into the weigh batchers and then charged into the mixers. After being mixed, the concrete goes directly into the block machines. Reclaiming belts at the bottom of the silos allow selection of aggregates or other materials used, to refill the six batching bins at will. Cement and fly ash are

A general view of the new plant of Precast Concrete Products, Inc., at Bridgeview, Ill., built to produce the first autoclaved units in Chicago.

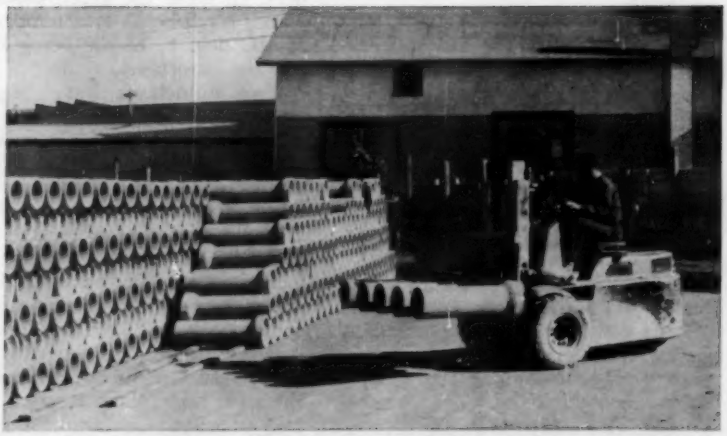
The material storage silos at the south end of the plant, which provide storage for 1,500 cu. yd. of aggregates and 3,000 bbl. of cement. Additional silos are planned.



# Here's How HYSTER® *PLANNED* MATERIALS HANDLING SAVES TIME AND MONEY in concrete products plants

**Here are typical examples** of how Hyster Industrial Trucks are helping to make *tremendous* savings in materials handling costs in *concrete products plants.*

Whether you are now using lift trucks, or haven't ever used industrial trucks of any kind, your Hyster Dealer is ready to help you achieve cost reductions. Because he keeps abreast of the materials handling problems and improvements, he has helped many concrete products plants realize more profit from their operations. *Why not call him today* and take advantage *of his specialized services? Materials Handling Trucks from 1,000 to 30,000 lb. capacities.*



**CARRYING FIVE CONCRETE PIPES** at the same time, and storing them seven high in one operation. Shortcuts like this help to reduce cost of handling heavy products.

## HYSTER DEALERS GIVE YOU ALL 3

**1. PLANNING.** Your Hyster Dealer will plan your materials handling operation from scratch — or will analyze your present system to see if it can be improved.

**2. THE RIGHT TRUCK** for *your* job from Hyster's complete line of industrial trucks (1,000-30,000 lbs) and over 100 job-attachments.

**3. THE RIGHT SERVICE**—ample spare parts stock, shop facilities, factory-trained mechanics and an efficient field service that keep your Hyster lift trucks going on your job, wherever your job might be located. Hyster trucks are noted the world over for their low downtime.

**THIS HYSTER XA-60 HAULS FULL RACKS** of green blocks from block machine into kilns. Removes cured block from kilns to yard storage and truck loading.

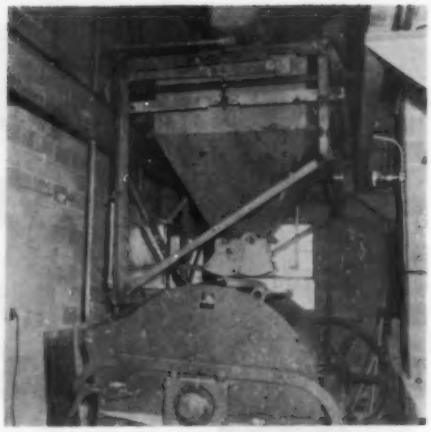
HYSTER

**HYSTER COMPANY**

2926 N. E. Clackamas.....Portland 8, Oregon
1026 Myers Street.....Danville, Illinois
Hyster N.V. .....Nijmegen, The Netherlands

**FOUR FACTORIES:** Portland, Oregon; Danville, Illinois; Peoria, Illinois; Nijmegen, The Netherlands.

Left: The tops of the six aggregate bins, showing the outlet from above to the cross-travel conveyor, which discharges material into bins placed over the weighing batchers.



Right: One of the two, twin-compartmented, track-mounted weighing batchers, set above the 50-cu. ft. mixers. Two complete production lines of batchers, mixers, and machines are planned.

reclaimed by means of screws and elevators.

Separate scales are installed on the batchers for aggregate and cement weighing. Two 50-cu. ft. Besser mixers provide the concrete for the two Besser Super Vibrapac machines, each of which produces 720 8-in. equivalents hourly.

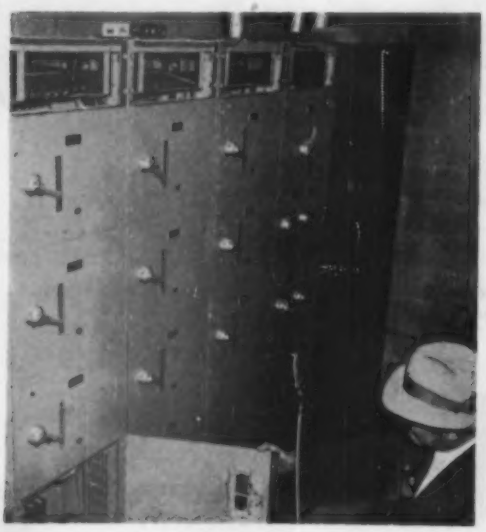
In front of each machine a 12-ft. diameter Kent Machine Company turntable provides space for four 84-block racks at a time. One position on the turntable receives the racks from curing; the next position affords space for unloading the pallets with blocks, the blocks being pushed off onto the conveyor to the cubing area, while the pallets go back into the machine; at the third position a rack is placed to receive green blocks coming from the machine; the fourth position is used for unloading these green blocks via lift truck to the preheat kilns. There are three such kilns, 9 ft. wide by 60 ft. long, built next to the curing cylinders. In these the green blocks are placed for 3 hours at a temperature of 100 deg. F. before being moved into the autoclaves.

Two autoclaves have been installed, and plans have been made for the installation of two more late this year. The cylinders, 8 ft. in diameter and 92 ft. long, were made by the Graver Tank Co. of East Chicago, Ind. The autoclave doors, furnished by the Struthers-Wells Company, cannot be opened until the pressure within is at practically atmospheric level. The doors are sealed by a steel circular ring which expands around its circumference by means of hydraulic pressure. (Necessary pressure is built up in an operating cylinder by means of hand pumping; and the doors can be opened or closed completely within a minute of operation of this system of locking.) Plans for the addition of two more autoclave units are based on future operations and possible two- or three-cycle curing.

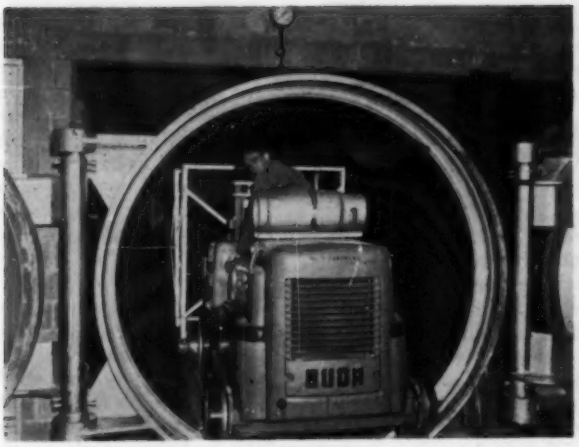
Sufficient boiler capacity for operating four autoclaves has been provided by the installation of a 500-hp. Nebraska water-tube boiler. This unit is fired by a fully-automatic, oil-burning "Indiana" burner, made by Williams Brothers and Miller, East Chicago, Ind. It operates on forced draft, and the installation includes automatic feed of a boiler compound for water treatment. Oil is pumped to the burners from a 15,000-gal. tank, and it is expected that fuel consumption will be at the rate of about 100 g.p.h. An economy provision is an automatic high-pressure line for returning condensate to the boiler preheater.

The autoclaves are insulated on their exterior surface for the entire length with a 4- to 6-in. layer of Zonolite (vermiculite) concrete. Six saddles under each unit cylinder provide for a total longitudinal movement of about 3 in., which takes place as the cylinder expands and contracts under heating. The autoclaves are of all-welded construction, 5/8-in. steel boiler plate

The main electrical panel which governs the operation of all units of production. In case of failure, power is automatically cut off through this board.



One of the two block machines, set in position practically ready for operation.

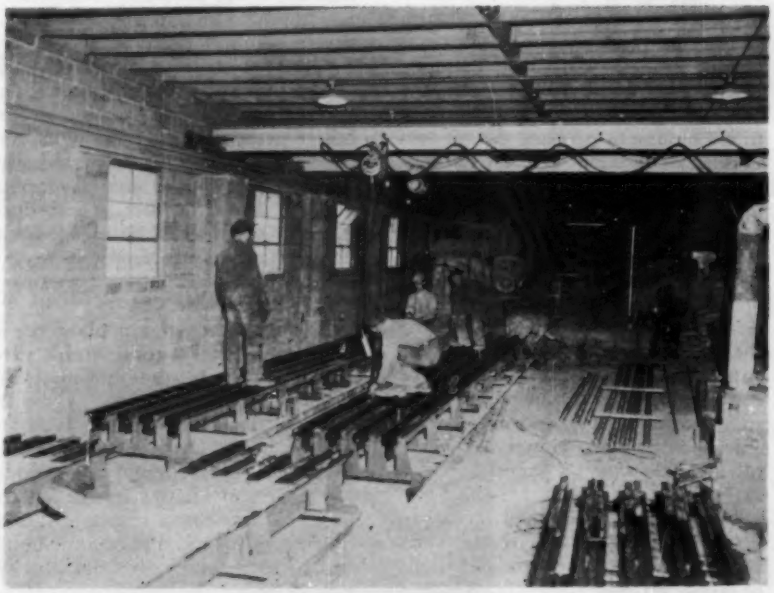


Views at the loading end of the autoclaves, showing the lift-truck with its rack entering one of the autoclaves.
On the right, one of the 12-ft. diameter turntables, holding four 84-block racks at a time; it provides space for disposal of units from the machines and removal to preheat kilns and cubing.

forming the shells. They are designed to take a working pressure of 150 p.s.i., although in practice they will be called upon to withstand pressure of only 142 p.s.i. The excess difference is necessary to offset corrosion which may tend in time to reduce the effective design thickness of the shell.

As a provision for eventual use of the autoclaves for vacuum drying, the shells have been reinforced against the possibility of collapse from external pressure by means of steel channels built into the third points of their length.

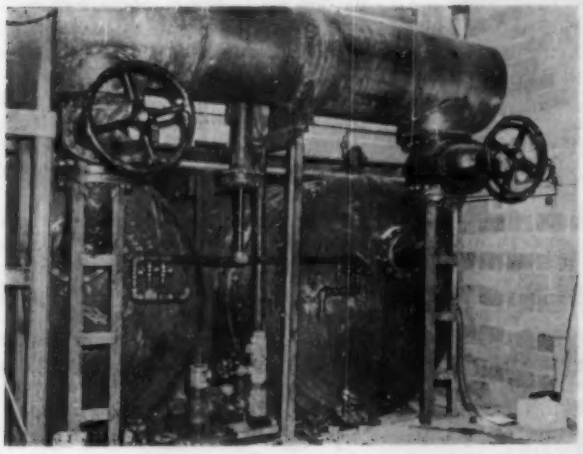
The main steam header consists of 6-in. pipe, from which 2-in. pipe supply lines lead into each of the cylinders. The manifold inside each cylinder consists of a 2-in. pipe containing holes spaced equally throughout their length. Steam enters the cylinders from the bottom; outlets are so installed as to achieve the maximum turbulence and at the same time prevent condensation drip upon uncured blocks.

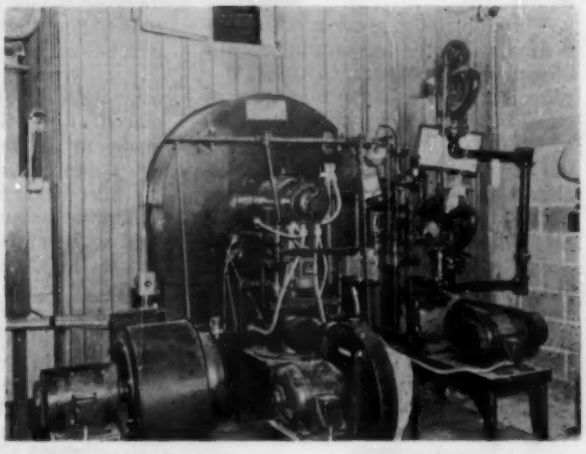


Above: Producing members for a joist floor system in the temporary building. These members will also be made in the new plant.

Below: Fully-automatic oil-burning burner which fires the 500-hp. water-tube boiler to produce steam.

Closed ends of the two 8-ft. by 92-ft. autoclaves, showing the steam valves and headers for control of high-pressure steam.





At the termination of an 8-hour curing cycle the cylinders are blown down by opening 1-, 2-, or 3-in. valves which are connected to a header, the initial operation being started under full pressure. From the header, the steam is piped to an exhaust manifold about 6 ft. in length, which is fitted with five nipples pointed against a baffle plate in order to muffle the sound of the escaping steam.

After a cylinder has been blown down, carbon monoxide fumes and hot air are exhausted through a 30-in. diameter duct, located on the north wall of the boiler building. A 36-in. diameter fan, driven by a 20-hp. motor, pulls a sufficient volume of air through the duct so that it is possible to enter an autoclave almost immediately after the door has been opened. Blow-down-pressure time is about an hour.

Rails extending the entire length of each autoclave permit the operation of conventional Allis-Chalmers-Buda model 60 lift trucks within the cylinders. These units are equipped to use butane or propane gas, to prevent any obnoxious or toxic exhaust fumes when they are operating inside the building. Small flanged wheels attached to the regular truck wheels engage the rails when the trucks enter the cylinders, the foundations of the autoclaves being sufficiently lower than the plant floor to bring these rails to the required level. The gap between the plant floor and the end of the rails in the cylinders is spanned by a set of movable bridge tracks, which are raised by means of a cable and a hand-operated ratcheted drum hoist.

Racks were designed by Mr. Lange and fabricated by the company personnel. They are essentially of conventional steel construction, but are built to hold seven tiers of 18½-in. by 26-in. pallets, each rack thus holding a total of 84 8-in. equivalents.

The autoclaves are loaded one at a time, using the full output of both block machines in order to accomplish the loading in the minimum of time. When 28 racks, holding a total of 2,352 8-in. equivalents, have been placed in the cylinder, the door is closed and the steam supply valve opened. Pressure and temperature are built up at a uniform rate to approximately 142 p.s.i. (350 deg. F.) This point is reached 2 or 3 hours after the door is closed. Full pressure and temperature are maintained for a period ranging from 4 to 6 hours before the blow-down.

Cubes of blocks are 48 in. on a side, each cube containing 84 8-in. equivalent units. Cubing is done by air hoist power, and the units are strapped after a cube is complete. The cube is set on a metal cart holding two such cubes. These are hauled, three carts to a train, to the covered yard storage. All block are delivered dry.

Mr. Lange's organization adopted high - pressure - steam curing only after prolonged and detailed study of curing systems in general, and their effect on the performance of concrete units. Their investigations led to the conclusion that to attempt to meet the rigid specifications of today by aging the units would require huge covered storage areas. The cost of maintaining such an inventory was also an item to be considered in deciding on a system of production.

Another fixed belief reached was that the firm's products must render maximum service to the buyer, and that a solution must be found—regardless of cost—to correct such causes of poor performance as shrinkage cracking. As soon as Mr. Lange was satisfied that high-pressure-steam curing would provide the best solution, he felt that he should gain by being the first to introduce this type of unit to the Chicago area; he felt that it was simply a matter of time before other producers would do likewise.

Although the present plant site is large enough for a considerable yard storage of units, the fact that the blocks can be delivered within 24 hours of their manufacture, ready to be put in the wall, is an economic saving of considerable magnitude. For practical reasons it will still be desirable to carry a reasonably-sized inventory of special sizes and shapes to be stored under cover until delivery in order to operate the block machines at maximum efficiency.

For some time the company has been licensed to produce the F & A inverted T-joist filler-block floor and roof system. Production of such units will be continued in the new plant. These joists are made of 3,000-p.s.i. concrete with steel reinforcing bars placed at the bottom. Filler blocks made on the Besser machines span the space between the joists. After the filler block has been set in place in the floor or roof, the area is covered with reinforcing mesh or bars, and a 3,000-p.s.i. concrete slab is placed over the structural elements to form a finished floor surface. The finished ceiling below needs only to be painted to give a pleasing exposed beam and acoustical block pattern.

In plan, the structures are located in a close, functional grouping. Aggregate and cement silos occupy a space 39 ft. by 30 ft. in area at the south end of the main building. Mr. Lange plans to construct a building for the production of joists just south of the main building, so that materials for this product can be conveniently served by the main silos and conveyors. At present production of joists is carried on in a 28-ft. by 100-ft. building at the north end of the area.

Next to the silos is a space 22 ft. by 60 ft., in which the material conveyors and bucket elevators are located; to the north of this space is the machine area, 55 ft. by 60 ft. in size. Adjacent to this area are the preheat kilns and the autoclaves, the latter housed within a concrete block structure which provides the maximum protection against heat loss. At the extreme end of the group is the boiler building, 20 ft. by 35 ft. in size. The firm's F & A system is used on all roof areas, the main framing being of reinforced concrete beam-and-girder construction, with concrete floors. A heavy reinforced concrete girder spans the 60-ft. width of the machine room, with only one center column, providing ample free space, as well as affording adequate support for the bin structures above. All walls are of Waylite lightweight block.

Hauling equipment includes eight tandem-drive G.M.C. No. 620 chassis with flat beds for carrying blocks; a Diamond-T tractor with a Cummins diesel engine, hauling a 125-bbl. cement trailer; a combination G.M.C. dump truck and four-wheel dump trailer, on which 30-cu. yd. loads of aggregates are hauled; another G.M.C. tractor-trailer, used for hauling the 30-ft. long concrete joists. Seven Hyster lift trucks are used in the plants, including two No. 40, two No. 60, and three No. 75.

While construction at the plant was virtually completed at the time of our visit, actual operations will not start for about three to four weeks, due to delays in the delivery of certain equipment units. Beginning of production will be marked by an open house, at which the local industry members and customers will be shown how autoclaved units are made in a modern plant.

The design and layout of the entire plant was made by the officials of the company, many of the ideas used emanating from the years of practical experience which Mr. Lange has had in producing concrete block. Officers of the corporation are Ben G. Lange, president; Arthur H. Beaver, sales manager, and Duane E. Lange, secretary-treasurer.

# Only Korpak has 3-Way Packing

Density determines quality . . . and packing determines density. No block machine has such packing thoroughness as the Korpak. Why?

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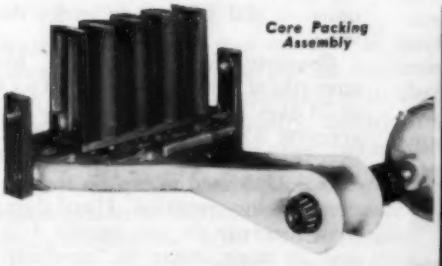
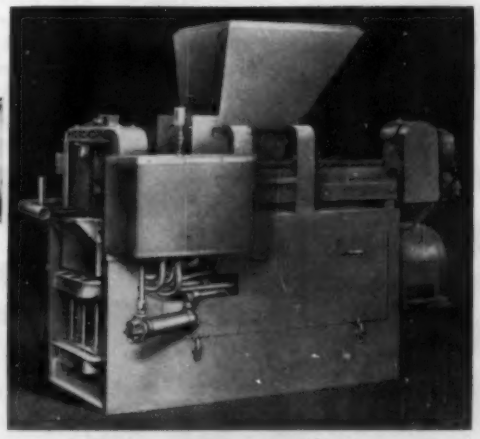


Core Packing Assembly



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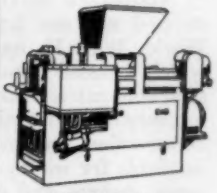
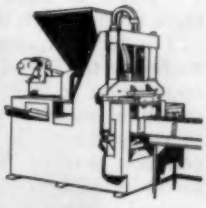
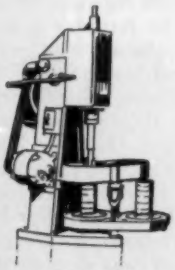
KORPAK BLOCK MACHINE



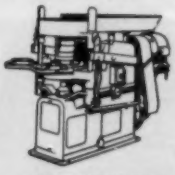
HYDRO-KORPAK BLOCK MACHINE



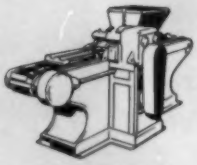
TWIN-PAK BLOCK MACHINE



CHAMPION DRAIN TILE MACHINE



DUNN "AUTOMATIC" DRAIN TILE MACHINE



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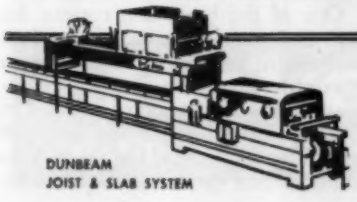
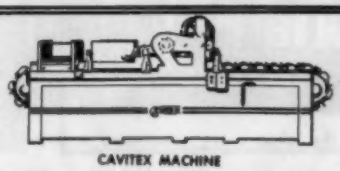
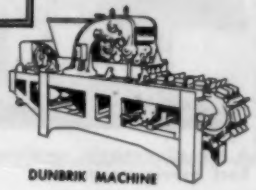


DUNBEAM JOIST & SLAB SYSTEM



CAVITEX MACHINE



DUNBRIK MACHINE

# Prestressed Concrete

By **FREDERICK E. KOEBEL**
Vice-president and Chief Engineer
Prestressing, Inc., San Antonio, Texas*

PRESTRESSING of concrete is a relatively old art in the construction business, and prestressed concrete has become since World War II one of the most widely "cussed" and discussed construction materials in the construction industry. Prestressed concrete is a construction material, a material available for use by architects, engineers, owners, and contractors. Like other construction materials, it has disadvantages as well as advantages. We prefer to think that its advantages far outweigh its disadvantages.

The act of prestressing may be described as the introduction of stresses opposite in sense to those that the structural member will be expected to carry during its use. The most common way of introducing these forces is with steel that has been stressed to some predetermined value and then restrained in the member from regaining its unstressed position. The restraint is accomplished either by bond, as in *pre-tensioning*, or by end-bearing devices as in *post-tensioning*. This theory was known early in the 19th century and was actually tried. However, because of the materials used the concrete soon became "unstressed." It remained until just after World War I for engineers and scientists to realize that the stress loss was due to the phenomena of creep and shrinkage. These loss factors were then controlled by the use of high-strength steel and higher-strength concrete, and the effect of creep became only a small percentage of the total initial stress in the steel.

There are two basic types of prestressing — pre-tensioning and post-tensioning. The prefixes "pre" and "post" indicate the time at which the steel is stresed with relation to the concrete pour. Pretensioning indicates that the steel is stressed between two fixed points and then the concrete is poured. When the desired strength of concrete is attained, the steel wire or strand is cut and the stress in the steel is held by bond between steel and concrete. This type of prestressing is particularly advantageous for long-line methods of production or factory production of small beams, roof panels, fence posts, etc. Pre-tensioning is not generally adaptable to job-site construction.

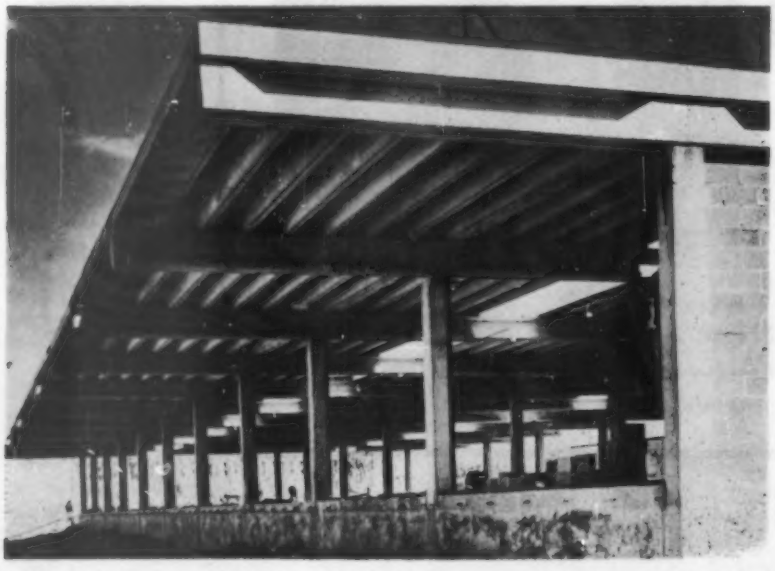
Post-tensioning, on the other hand, indicates that stressing is done after the concrete is cast and has attained its required strength. The steel is stressed, utilizing the concrete member as a reaction for the jacking equipment. Naturally, bond between concrete and steel must be desroyed, and this is accomplished in two ways. The steel may be placed in the forms with a greased coating, or they may be placed in a duct formed in the concrete member. This duct is either a removable rubber duct or it may be metal tubing that remains in the concrete. The duct is then filled with grout for corrosion resistance and added strength after prestressing. In general the use of a complete grouted steel wire is recommended for post-tensioning work. Tests indicate that the strength of a member with grouted steel is greater than the strength of a similar member with non-grouted steel.

The materials for prestressed concrete are steel and concrete, as in reinforced concrete. However, here the similarity ends. Steel for pre-stressing usually is wire, cable, bars, or strands. The wires and strands have ultimate strengths in excess of 240,000 p.s.i. and are stressed initially up to 170,000 p.s.i. Bars have ultimate stresses up to 150,000 p.s.i. In post-tensioning systems, since the steel is anchored by end devices, various end anchorage systems have been developed and are in common use. Two fundamental ideas are followed in these end anchorages — mechanical holding such as threaded units or headed units — and friction or wedge devices.

Concrete for prestressing has strengths of from 4,000 to 7,500 p.s.i. at 28 days. Water content is low and concrete is usually of low slump. For that reason the word "cast", not "poured," is used to explain the concrete placing operation. Usual slump measurements do not exceed 4 in. and in many instances "no-slump" concrete is used. One products manufacturer has coined a new slump designation "negative 2." His meaning is that the concrete is so dry that water to cause 2 in. of slump would have to be added to produce "no-slump" concrete. By using a low-slump or dry concrete, higher strengths are reached much more quickly with the minimum of shrinkage and creep and with a higher Young's Modulus, thus giving a more desirable material.

One of the basic cost reasons for high-early-strength concrete can best be brought out by the fact that in many instances it is desirable to remove forms in a period of hours. On one job forms were being removed in four hours without the use of vacuums so that the forms could be re-

*An address presented at the meeting of the Midwest Ready-Mixed Concrete Association, Drake Hotel, Chicago, Ill., March 7 to 8, 1955.



A precast concrete warehouse in which the girders are prestressed and post-tensioned. Roof panels are precast.

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# "BALANCED DESIGN"

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Baker quality permits full 6 months' warranty.

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Mast design allows higher standard lift than ordinary trucks.

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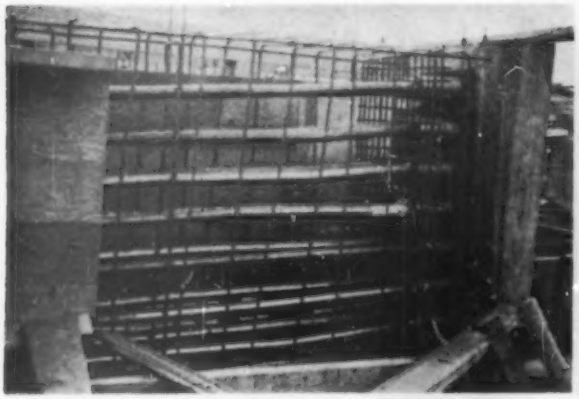
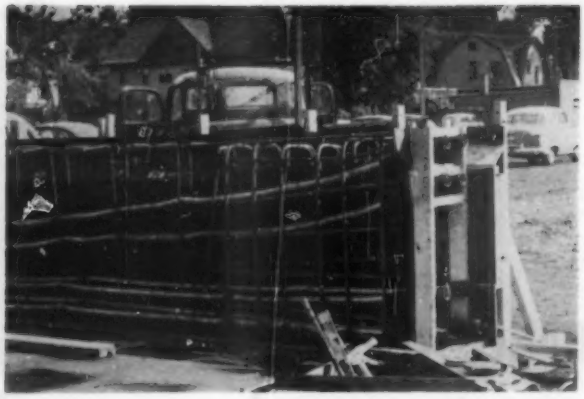




End block details on post-tensioned girders, showing the mild steel and metal tubing which contains the prestressing wires.

used immediately. With vacuum, the removal may be much faster. Also in pretensioning plants where products are being turned out on a mass production basis, it is desirable to introduce the stress as fast as possible, so that the member may be removed and the bed re-used as soon as possible. There are pre-tensioning plants that are presently stressing in a 24-hour cycle. This would indicate strengths above 4000 p.s.i. in less than 24 hours.

Many people ask—and logically so—whether with such dry concrete voids and honeycombing result? The answer is yes, if adequate care is not taken in the casting of the concrete. Vibration, both internal and form type, should be used. Vibration means high-speed vibration with a small vibrator head. On one job a contractor was prepared to pour a girder with a 5 in. web thickness, with steel, etc., through it, using a 2 in. diameter vibrator head. It was hard to convince him that it would not work until he stripped the forms from his first girder and was forced to repour it. The web literally looked like a sponge. We also use various admixtures like Pozzolith when it is deemed necessary. This somewhat increases workability.

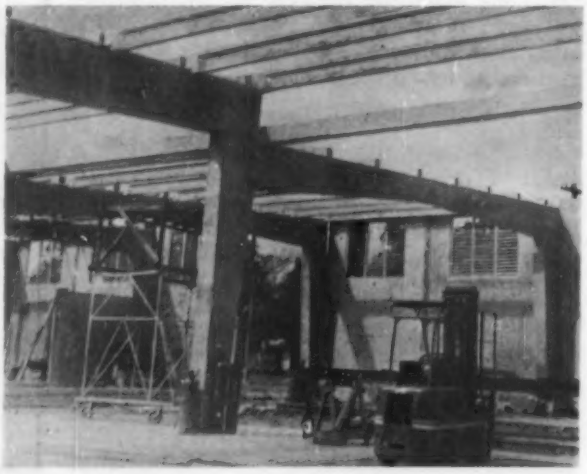
The concrete used for prestressed members is also somewhat different from mass concrete in the size of aggregates used. Because of the relatively thin sections in use and the consequent smaller clearances between steel reinforcing, the maximum size for aggregate is usually ¾ in. Many jobs have been built with a top size aggregate not exceeding ½ in.

The question may be asked, how does prestressing affect the ready-mix concrete operators? Actually, the phrase that best describes this effect is "quality control of operations." We know, of course, that the various ingredients making up concrete vary to some degree. However, most prestressed concrete specifications will give minimum requirements for these ingredients, and strength requirements will be based on these minimum values. The biggest variable, of course, is the water content. It remains for the concrete producer to control this moisture content adequately when producing concrete for prestressed members.

The need for quality supervision is great. On large jobs it is considered good practice to utilize a man at the batching plant and a man at the job site for control purposes. To date, standard slump tests and cylinder tests have been used to control and determine the strength of the concrete. While both of these methods have been proved satisfactory for conventional reinforced concrete, it appears that perhaps different methods should be established for control. Since in prestressing such emphasis is placed on high-early strength, where results of cylinder tests are apt to be erroneous, some other method of strength determination may be required. Perhaps the use of rebound testers, which the manufacturers claim give excellent results, is one method to determine strength quickly, accurately, and inexpensively. Some specifications require the minimum of three cylinders per prestressed member. This may mean as little as 3 cu. yd. of concrete tested per girder, which is a rather expensive testing proposition if many girders are involved.

After the concrete of the correct quality is delivered to the form, whether job-mixed or ready-mixed, the same amount of control is necessary on the part of the contractor. Careful handling and casting is required. Watering of forms just before casting is not recommended. Care must be taken in controlling vibration; too little may cause honeycomb and too much may cause segregation. Dry concrete of this type sets up rapidly, hence there must be a continuous pour, so that no cold or semi-cold joints occur in the members.

Care must be taken by the contractor that prestressing tendons are not misplaced during the casting of the concrete. When the concrete is



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*Big Inner Cone for Fast Charging* . . . 8-9 seconds per yard . . . and eliminates spilling of materials.

*Better Blade Design,* with flange on the discharge side, prevents segregation during discharge.

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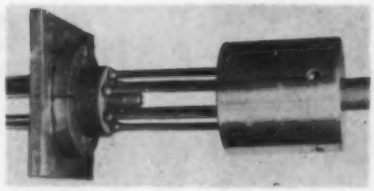
finally cast, proper curing procedures should be followed to prevent crazing, shrinkage, and excessive drying. Thus it can be seen that a new era in concrete is at hand in which quality control means just that—*quality and control of concrete from the instant the ingredients enter the mixer until the girder is finally prestressed.*

The design of prestressed members is surprisingly easy. Two basic ingredients are necessary. First and foremost, is a firm knowledge of the fundamentals of mechanics and strength of materials. The second is the realization on the part of the designer that he is using a material which, although it is made up of the same components as reinforced concrete, is not in any way related to the design of reinforced concrete. Sections in prestressed concrete may be used which are impossible in reinforced concrete.

Actually, the limiting factor in many designs is the ability of the field man actually to form and cast the designed section. In many instances the design will either make the construction economical or will price it entirely out of reason—for example, making a design which, although structurally sound, is too expensive, or produces sections that are difficult to form and cast. . . . Making web sections too thin increases the final cost, and making sections too shallow necessitates the use of much more material. As yet there are no nationally recognized codes or recommended practices for the design and construction of prestressed members. However, the Bureau of Public Roads has recently published criteria, and presently a joint A.C.I.-A.S.C.E. committee is working on a prestressed concrete manual.

Prestressed concrete is adaptable to many uses. Bridge construction to date has made the largest use of prestressing. In many instances prestressed concrete design has been offered competitively against steel for a given structure. In some instances the prestressed concrete design has been successful and in other instances steel design has been successful. In quoting from one recent bid anaylsis for a bridge structure with fifteen 50 ft. spans, the steel design was low, but the results are very interesting. The job was a unit price job, and all quantities, with the exception of the superstructure, were identical. The superstructure for the steel alternate included a unit bid price for structural steel, reinforcing steel, and Class AA concrete. Railing, shoes, etc., were extra items. The prestressed design had the entire deck,



**The type of end anchorage device used by Prestressing, Inc.**

including shoes, as a bid item in per sq. ft. of bridge deck. The engineer's estimate for the job was $200,000 for both designs. The low prestressed concrete bid item of bridge deck was $3.17 per sq. ft. The steel design had the following bid values: $.093 per lb. for structural steel; $37 per cu. yd. for Class AA concrete; $.08 per lb. for reinforcing steel. The engineer's estimate for these figures was: structural steel, $.12 per lb.; reinforced steel, $.12 per lb.; Class AA concrete, $50 per cu. yd. It is interesting to point out that all contractors bid the steel and Class AA concrete at just about the same unit prices. The final difference between the steel and prestressed concrete alternate was $3,000 and the job went for $150,000. It would appear that the presence of a prestressed alternate brings out the best in the steel prices. However, prestressed concrete is being used more and more for bridge construction. Many large jobs with spans up to 150 ft. have been let in recent months, and many more are presently on the drawing boards throughout the country.

Perhaps one of the most fertile fields today for prestressing is that found in building construction. Combined with precasting, prestressing is being used more each year. One of the primary uses of prestressed, precast elements is in warehouses, where owners are realizing the combined value of long spans, fireproof material, low maintenance cost, and speed of construction. Typical buildings of this type are precast, prestressed, single-story warehouses as small as 15,000 sq. ft. and as large as 200,000 sq. ft. in area. The warehouses are set up in modules of 40- to 50-ft. beam spans and 25- to 35-ft. spans in the secondary members. The secondary member is a purlin, placed at 8-ft. centers and covered with a 2- by 8-ft. precast concrete plank. Often the secondary span is covered with a channel-shape precast element. Walls are tilt-up and sometimes prestressed for ease of handling. In areas where seismic conditions are important, these members are made continuous by installing mild steel or prestressed cap cables after erection.

Beams for this type of construction are usually I-shaped sections 30 in. deep weighing approximately 16,000 lb. and are therefore easily placed with a ¾-cu. yd. crane. Purlins have T-sections and weigh approximately 4,000 lb. each.

Erection and joining of these precast elements is surprisingly simple and quick. With proper planning, the job will flow smoothly. With jobsite casting, the precast elements are usually started at the same time as the foundation. Beams, purlins, and roof panels are cast daily, thus permitting multiple use of forms. Usually forms for this type of job are of 10-gauge steel, braced with steel angles. Beam and purlin forms are removed within 18 to 24 hours and post-tensioning operations on girders proceeds in 3 to 7 days.

The prices on construction of this type compare favorably with ordinary construction. A recently-completed 25,000-sq. ft. warehouse in the South showed the cost of the structural frame to run something like this, for bays of 50 by 25 ft. in area:

| | per sq. ft. |
|---|---|
| Beams @ $10 per lin. ft. | $ .40 |
| Purlins @ $3 per lin. ft. | .38 |
| Roof plank @ $.40 per sq. ft. | .40 |
| Columns @ $.06 per sq. ft. | .06 |
| | $1.24 |

The cost for the remainder of the building, plus profit, would be the same, regardless of the structural frame, depending on the treatment given to the building. . . .

From cost information it is obvious that through the use of prestressed, precast systems, combined with contractor know-how, a highly desirable type of warehouse or industrial building can be erected with all-concrete construction at a highly competitive cost.

Other common uses of prestressing include prestressed piles, small pretensioned roof elements up to 30 ft. in span, and tank and pipe construction. There is experimentation going on now to apply prestressing to highways and airport runways.

In the last five years the prestressed concrete industry has developed from a small, low-value industry to its present position. . . . It is felt that the future growth of the prestressed concrete industry is unlimited and that the problems—there are a few—can be successfully encountered and overcome. It has been shown in the past that prestressing is economical, structurally sound, and easily adapted.

### Smithwick Staff Members Promoted to Higher Posts

Several promotions of staff members were made at a recent meeting of the Smithwick Concrete Products board of directors. This announcement was made by S. Carl Smithwick, president of the Portland, Oreg., firm, who is also president of the National Concrete Masonry Association.

Robert B. Clarke, who has been a salesman for the company for the last six years, was promoted to the post of assistant sales manager and a member of the board of directors. Carleton G. Smithwick, production manager of the firm, was elected to the position of executive vice-president. Paul L. Nutt, who has been with the firm since its founding in 1946 as sales manager, has been named a vice-president of the company. Dwight G. De Haven, who started with Smithwick four years ago and is now general manager of the company's Eugene, Oreg., division, serving the southwestern portion of the state, was also recently elected a vice-president.

Smithwick Concrete Products staff members who were recently promoted (left to right): Robert B. Clarke, Carleton G. Smithwick, and Paul L. Nutt.

### Ready-Mix, Block Producers Announce Many New Plants

A steadily increasing demand for concrete and concrete products is evidenced by the many new ready-mix and block plants established in recent months. Among those noted on the West Coast is an operation launched at Stockton, Calif., by the Stockton Building Materials Company. This fully-automatic batching plant has a capacity of 600 cu. yd. per day. At Riverside, Calif., the Magnolia Ready Mix Company recently went into operation with a daily capacity of 700 cu. yd.

One of many new ready-mix operations in the Midwest is Cresco Ready Mix, Inc., formed at Cresco, Iowa, by the Burgess & Sons Lumber Company and the Keune and Balk Limestone Company.

At West Memphis, Ark., the Rains-Nations Ready-Mixed Concrete Company, Inc., began production in its dry-batch (of all things!) plant.

### Thomas, Baugh, Fowler Named To New Jaeger Positions

Promotion of A. C. Thomas from Truck Mixer Division sales manager to assistant general sales manager, has been announced by The Jaeger Machine Company, Columbus, Ohio. Mr. Thomas has been associated with sales promotion and sales at Jaeger since 1940 and has directed truck mixer sales since 1948.

Emil L. Baugh, who has been southeastern district sales representative for Jaeger for the last 10 years, has been appointed to succeed Mr. Thomas. R. E. Fowler, now a special field representative for the firm, will succeed Mr. Baugh as southeastern representative.

### W. H. Siebecker Honored By Manufacturers' Assn.

William H. Siebecker, retired designer of bulk carriers, cement and concrete mixer trucks, was honored recently when he was the guest of honor at a meeting of the Manufacturers' Association of San Mateo County, Calif.

Mr. Siebecker retired in 1951 at the age of 85 after heading his own company for more than 50 years. He designed and manufactured the first concrete mixer truck in his plant in 1927.

### Ownership Changes Noted In R.M.C. and Products Plants

Many changes in ownership of concrete producing firms have been noted in scattered areas. In the Northwest the Valley Concrete Pipe Company, Albany, Oreg., was sold to Russell F. Kretz. Pre-Mix Concrete, Inc., Roseburg, Oreg., was acquired recently by the I-Deal Concrete Company, located in the same city. At Othello, Wash., the Othello Concrete Company has been sold to Pre-Mix Concrete, Inc., Kennewick, Wash.

Richard W. Anderson has bought the Gates Concrete Block plant, located at Largo, Fla., and Frank Warren sold his firm, the Perry Concrete Products Company at Perry, Fla., to Perry Industries, headed by Byron Butler. Southern Materials Company, Inc., Norfolk, Va., purchased the County-City Supply Company, Inc., producing ready-mix in Lee Hall and York counties, Va.

In the Mid-West, St. Charles Concrete Products, St. Charles, Ill., was sold to Polly Brothers Concrete. The Spahn & Rose Lumber Company, Tama, Ia., has purchased the Tama and Toledo Ready Mix Concrete Company. At Libertyville, Ill., the Johnson Concrete Works, operated by G. A. Johnson since 1934, was sold to H. O. Larsen and R. D. Johnson.

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At a meeting of the Iowa Concrete Masonry Association held recently at Des Moines Fred W. Schreiber, Des Moines Concrete Products Company, was named president, succeeding A. W. Schultz. Other officers chosen at the same time were as follows: Luke Altfillisch, vice-president; and Clair Smith, secretary-treasurer. Nine directors were also named.

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The appointment of J. R. Logan to handle sales of building materials and ready-mixed concrete in the Des Moines area was announced by R. V. Roupe, president and general manager of the Crown Concrete Company of that city. Mr. Logan has been associated with gypsum products manufacturing for 25 years.

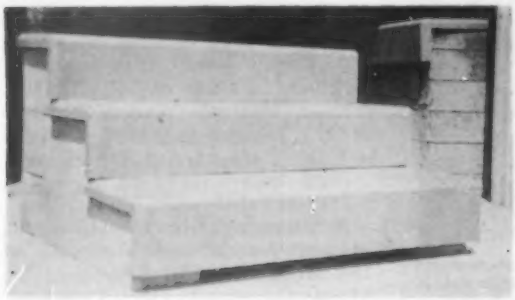
### Cleveland Builders

*(From page 191.)*

vestment of around $1,250,000, including clearing the site and the constructing the future dock structure and present sheet steel piling along the river frontage. When the present increasing demand for ready-mixed concrete falls off, probably during the winter months, it is expected that some of the C.B.S. concrete will be utilized for placing a permanent dock structure, or for other refurbishing of the plant. However, as long as the plant continues to have large jobs to take care of, like the 50,000 cu. yd. furnished the contractor building the Aluminum Co. of America stamping plant last year, there will be little opportunity for "company requisitioning" of concrete for home use.

W. H. Crangle is president of Cleveland Builders Supply Company, and Jay C. Ehle is vice-president in charge of operations. C. Jack French is chief engineer and manager of the Concrete Division of the company, while Ralph J. Reinhartz is superintendent of the ready-mix plant. Other key personnel include dispatchers Chuck Rohde and Bill Curtin in the yard office and Leonard Palcisko as operator in the batching plant.

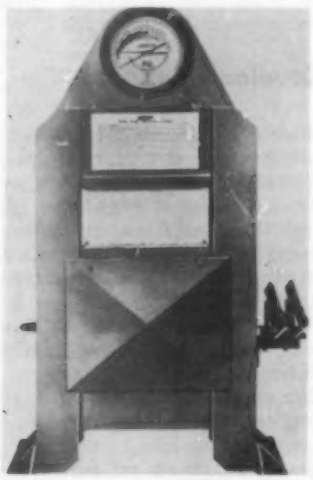
# CM New Machinery and Supplies



● A new step tread mold of rugged construction has been put on the market by the R. L. Spillman Co. Use of their mold assures a uniform, attractive product which will sell itself to your customers. The firm also markets an electric vibrating table with interesting features. ← (101)

● Universal Door Carrier, Inc., kiln closure specialists since 1904, have announced two new products named the Uni-Seal gasket and Uni-Seal rubber-to-steel cement. The gasket is formed of a new formula butyl rubber which remains tough and resilient under kiln conditions—will not harden or crack, according to the makers. The cement is a new specialized compound developed for bonding rubber to steel under conditions such as prevail in kilns. A pint of the cement covers 320 lineal feet with a non-cracking, break-proof bond. Uni-Seal cement is available in half-pint, pint, and quart cans with applicator brush included. ↑ (103)

● Newly improved and stronger than ever is the In-A-Slide all steel basement windows made by New Monarch Machine and Stamping Co. This long-lifted, precision built window may be built into units of from 2 to 6 to a section if desired for larger glass area. They are easily installed and removed for glazing or washing. Made in 3 standard sizes, they are available in putty-type glazing only. The design permits finger-tip opening and closing, and self-supporting hinges afford deflected ventilation. Special screens and storm sash to match are available. → (102)



● Designed and engineered for use in plants rather than laboratories, this new Forney Model QC-200 concrete compression tester has a capacity of 400,000 lb. This machine is equipped with the Forney direct reading gage with 12-in. dial and traveller hand. A complete conversion chart mounted directly below the gage enables easy, fast readings for all standard sizes not shown on the dial. The lower platen is freely mounted on a spherical seat so that specimens can be easily aligned top and bottom, and the 8-in. diameter piston is raised by means of dual high and low pressure pumps. The low pressure pump raises the platen quickly into compression, and the high pressure pump raises it at the speed recommended by A.S.T.M. for the actual testing. Riser blocks adjust the platen height to suit the specimens being tested. ↑ (104)

JUNE 1955

## MORE INFORMATION PLEASE

**THE CONCRETE MANUFACTURER**
**431 S. DEARBORN ST.**
**CHICAGO 5, ILLINOIS**

Please send more information on items described in editorial columns of this issue, as circled below.

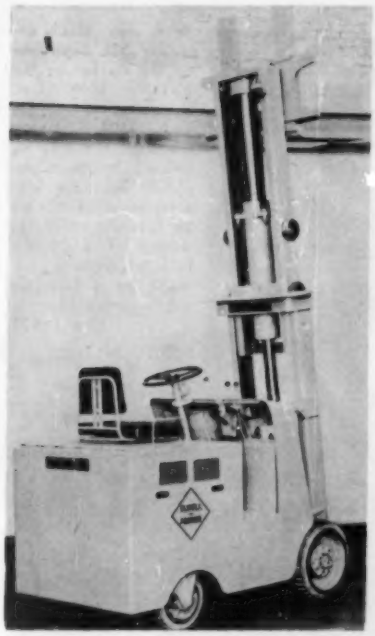
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 |
| 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 |
| 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | | |

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____



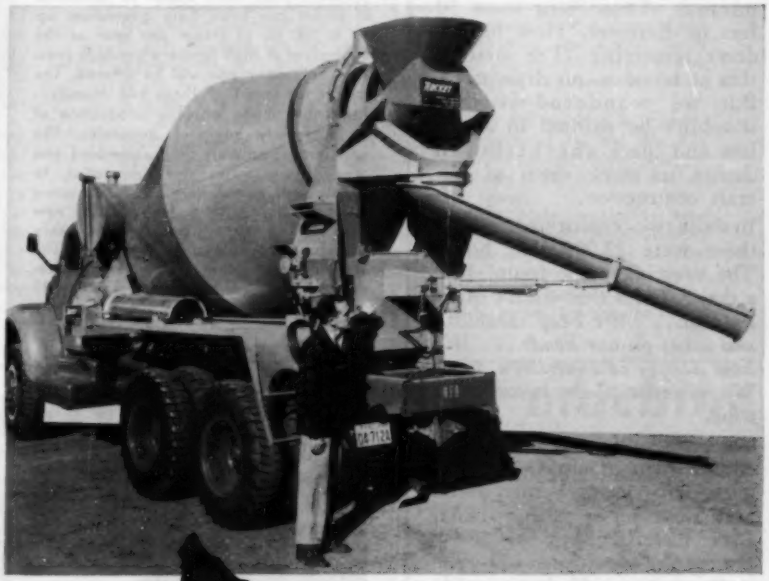
● A 5,000 lb. capacity, electric-powered fork truck has been introduced by The Elwell-Parker Electric Co. The truck, Model F-30T5, features contactor controls, worm drive, caster trail axle, packaged unit assemblies, and a rocker arm tilt. Specifications are: Travel speeds—with full load, 5½ mph., without load, 6 mph.; Lifting speeds—with full load, 25 fpm., without load, 42 fpm.; Lowering speeds—with full load, 45 fpm., without load, 36 fpm. The hoist and tilt mechanism is hydraulically operated, and a gear type pump connected to the electric motor supplies the pressure. A double-acting tilt cylinder applies equal force to both sides of the uprights thus assuring rigid support and reduced side sway. ↟ (105)

● Muller Machinery Co., Inc., has recently announced that the drums in its line of plaster and mortar mixers are now made entirely of "Mayari" abrasion-resistant steel. This type of steel is the same as is used in large truck mixers where it has demonstrated unusual resistance to wear under tough use. The manufacturer states that this is one of a series of improvements now being incorporated in their products to improve quality and increase the life of these machines. The sturdy construction and easy portability of these units, which are available in a wide range of sizes, give the units a long, useful life. ↟ (106)


**NOTED OPERATORS IN READY MIXED CONCRETE TURN TO . . .**

*The new* **ROCKET**

Many well-known producers of ready mixed concrete have tried the new Rocket, and have voiced their approval with re-orders. Their reasons are plain enough. First, they like Concrete Transport Mixer Company's policy of dealing direct with the customer, enabling him to buy a high-quality, light-weight mixer for considerably *less* than other makes. Then too, they like the simplified design—no complicated mechanisms to add weight and increase cost. These are the men who attribute much of their success to rugged, dependable equipment—obtainable at exceptionally reasonable prices. Their endorsement is staunch testimonial to the high quality of products manufactured and guaranteed by Concrete Transport Mixer Company.



**LOOK AT THESE FEATURES!**

*Hydraulic Chute Control* eliminates manhandling. Controls grouped for easy access.

*Aluminum Extension Chute* attaches to 36" fold-over addition to main chute. Total length: 12' 6".

*Electric Revolution Counter* kit included; you can handle any specifications with the Rocket!

*Special Alloy*, abrasion resisting steel used at all wear points.

*Unobstructed Hopper*, for rapid charging, no spilling or waste.

*Positive Chain Drive*, flexible power, not affected by truck twist, road shock.

*Standard Industrial Engine*, truck-type transmission. Repair parts readily available.

*Three-Point Suspension*, one-piece cast steel precision machined ring.

*Available in* 3, 3½, 4½, 5½, 6½ yd. models.

*DEMAND THE BADGE OF DEPENDABILITY*

**CONCRETE TRANSPORT MIXER CO.**

**MAIL THIS COUPON TODAY!**

Gentlemen: Please rush me complete prices, literature, and terms on the following:

☐ New Rocket Revolving Drum Truck Mixer
☐ Hi-Lo Stationary Drum Truck Mixer
☐ Batching Equipment
☐ Plant Mixers ☐ Water Meters CM

Name_____
Firm_____
Address_____
City_____ State_____

**4989 FYLER AVE., ST. LOUIS 9, MO. FLanders 2-7800**

# COMMENT
*from the*
## BUTLER ENGINEER

### —of cement shortage protection . . . and 22,000 bolt holes

One of our good customers—a Ready Mix Operator, decided to poke Ol' Man Cement-Shortage in the snoot. Good. So he ordered two silo-type bins from us, *each* providing 5000 barrels for reserve. Great Day! Storage for 10,000 barrels! As a glittering masterpiece of understatement, I'd say such capacity is unusual. Those bins were 30 feet in diameter. How high I don't remember (I'm writing this at home so no drawings). But we wondered if they shouldn't be painted in a yellow and black checkerboard design to mark them as aircraft obstruction.

In those two cement storage bins there were 22,000 bolt holes. The erecting crew found half a dozen holes that didn't quite register . . . *We heap sackcloth and ashes on our heads . . . We bow deeply in contrition, Boss.* We promise to do better next time.

Took my wife and complete complement of children on an auto trip East. Pennsylvania and New Jersey Turnpikes. Ever have a flock of lively youngsters frustrated by the walls of a car? Had to provide diversion so we made a game of counting Butler Plants vs. others along the way. Happy to say the game worked and also very happy that Butler Plants far outnumbered the others.

The big developments in the Road-Building and Ready Mixed industries are the automatic *one-man operated* Roadbuilders Plants and the punched-card electronic batchers for Ready Mixed Plants. Both developed by Butler . . . These are history-making inventions. We think they are present-making advances, as well. Want details? Please write.

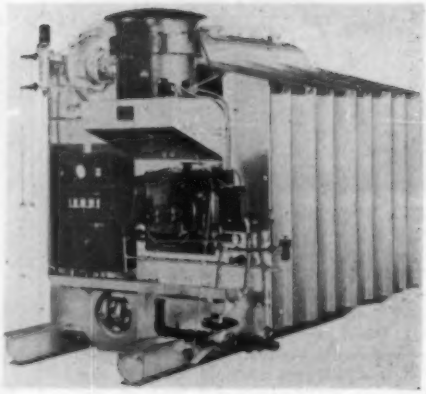
Sincerely,

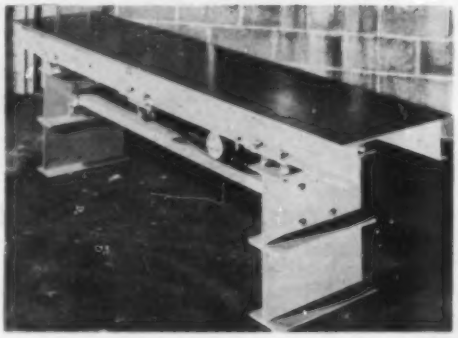
*The Butler Engineer*

BUTLER BIN COMPANY
WAUKESHA, WISCONSIN

● A new block unloader has been put on the market by the Russell Mfg. Co. Known as the Syde-Lode #600, it is loaded from the side by fork-lift trucks. Completely hydraulic with a minimum of moving parts and a rated capacity of 8,000 lb. lift, Hydrahoist unloads by a traveling overhead trolley. ← (107)

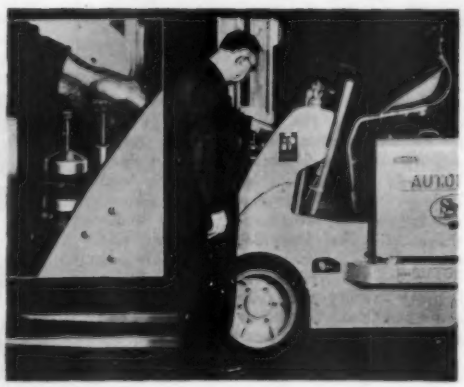
● The Kewanee-Springfield water-tube package generator is available in 14 standard sizes from 6,000- to 45,000-lb. of steem per hour. Twin generators up to 90,000 lb. of steam per hour or the equivalent of high temperature-high pressure hot water also will be offered. The joining of forces of these two manufacturers has made possible production of an extremely compact generator. The units are completely shop assembled and ready upon arrival for connection to supply and outlet lines. It is designed for gas, oil, or solid fuels. These new units start in capacity and pressure where Kewanee Fire-Tube units leave off. The new units will be marketed through Kewanee-Ross. → (108)

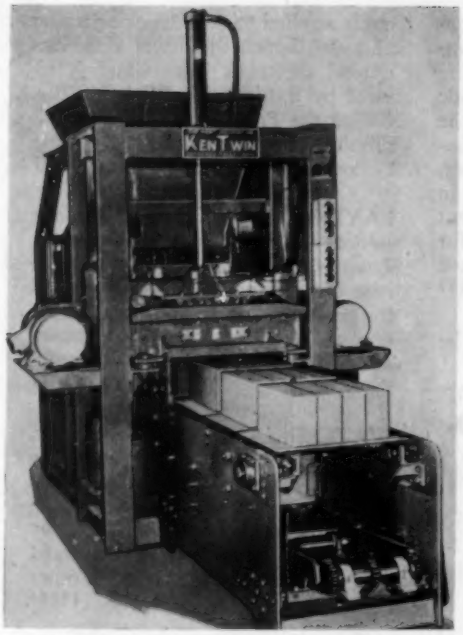




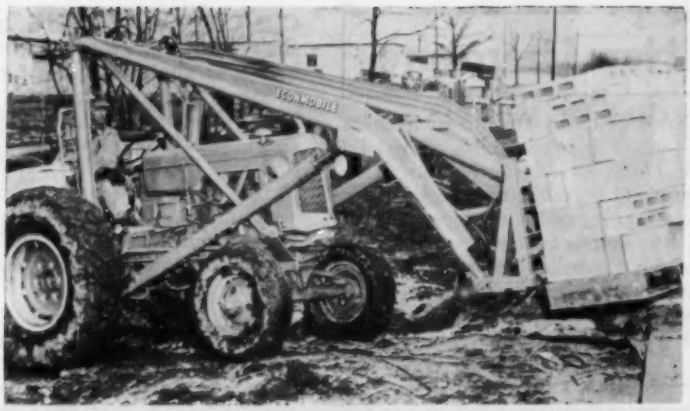
● Featuring vibration which is adjustable from an intense to mild degree, this flat top vibrating table made by the Concrete Mold & Engineering Co. has table top dimensions of 8 ft. by 20 in. with standard heights of 18- and 26-in. These dimensions can be varied to match individual needs. Load bearing capacity is well over 1,000 lb. The tables are simply but ruggedly made to insure little maintenance trouble or time loss. Send for full particulars. ← (109)

● Built-in centralized lubrication made by the Lincoln Eng. Co., has been introduced in the electrically-driven industrial trucks made by the Automatic Transportation Co. Called the Multi-Luber, the system assures greater safety and economy, according to the manufacturer, because lubrication of all vital points is positive. The Lincoln Multi-Luber is mounted in position for extra-convenient operation. A single stroke of the lever and vital steer-axle bearings are simultaneously oiled. → (110)






● The Kent automatic front pallet return is low priced and yet it incorporates such a high-priced feature as returning the pallet directly into the front of the machine as the pallets are dropped from a magnetic off-bearer. The complete unit is only about 8 in. wider than the pallet being fed and extends approximately 5 ft. in front of the machine. The pallet return can be built to fit any size down to an 18- x 18-in. pallet. The unit has no extra motors or controls, and may be easily installed on any KenTwin in the field. ▲ (111)



● Versatile, as well as economical, is the word for the Economobile, the new heavy-duty, high-lift hydraulic loader complete with industrial power unit, manufactured by the American Road Equipment Co. It features a wide range of auxiliary equipment and extreme maneuverability (a turning radius of about 14 ft.).

Equipped with an aggregate bucket, the Econmobile can be used for loading concrete bins for job-mixed concrete. With a dozer blade, it can be used for leveling, grading, backfilling, and similar earth-moving jobs. It is equipped with a 30 bhp. engine and attains speeds up to 12.6 mph. It is of heavy-duty, reinforced tubular construction. A 6 cu. ft. welded box counterbalance is standard.

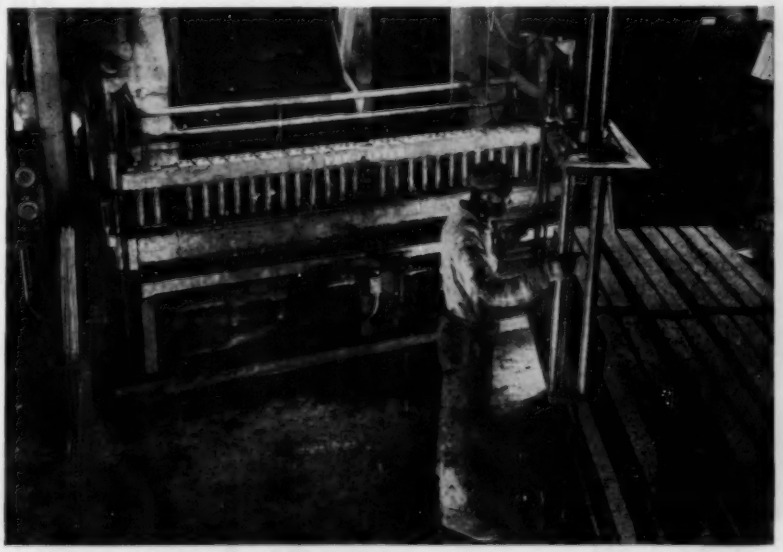
Rated lifting capacity is 2,000 lb., when the machine is properly counterbalanced. It lifts loads to approximately 18 ft., but this may be extended to 22 ft. by using an auxiliary hydraulic tower. Attachments which are available include a clean-up fork, material bucket, work platform, and the auxiliary hydraulic tower.

The Econmobile is equipped with 14.00x24, 6 ply, roadbuilder type tires in the rear; and 7.50x16, 8 ply tires in the front. A self-leveling locked hydraulic system with manual control by-pass uses a continuous, front power take-off driven pump. Heavy-duty, 4-in., single acting cylinders are used on the boom, while tilt cylinders are 4-in., heavy-duty, and double acting. The control valves are of the three-lever type. ▲ (112)

● The "Hi-Lo Stacker," a line of battery-powered, tilting fork hand trucks in 1500, 2000, 2500, and 3000 lb. capacities, 24-in. load center, has been added to the "Powrworker" series manufactured by the Clark Equipment Co. Equipped with Hi-Lo telescopic channel uprights, the truck provides a free lift of 64 in. with an 83-in. overall height and a maximum fork height of 130 in. The Stacker can also be equipped with single lift (non-telescopic) channels. Ten degrees of tilt back and three degrees forward are accomplished through a double-acting cylinder which rigidly supports the upright channels and load at any tilted position. ▲ (113)


# more than a lintel machine

**Be the first in your market to use the amazing PreCaster which created such a sensation at the NCMA Convention at Cleveland. Enjoy the extra profits in 1955 from quantity production prices on concrete units that will strip through a straight box . . . hard-to-make slabs, highway guard rail posts, fence posts, joists, and the like.** ***Relatively low investment! One-man operation!*** **Write for data sheet and price list to** ***PreCaster Inc., 5217 Beech Street, Cincinnati 17.***



## New Literature

**DRAIN TILE** machine which makes tile up to 8 in., is being offered by the *Concrete Machinery Co.* This compact, portable unit weighs less than 200 lb. and is equipped with a ¾-hp. electric motor. It can also be run by a gasoline engine. The firm says that 2 men, using a mold band each should produce from 1300 to 1800 drain tile per day. **(114)**

**CONCRETE STICKING** to machinery and other items can be eliminated by applying the new coating called "Epoxyn Crete-Free", made by *Co-Polymer Chemicals, Inc.* The chemical, which has excellent adhesion and is resistant to weathering, corrosion, solvents, etc., comes in clear for application over present paint, or in any desired color for application on new or refinished equipment. **(115)**

**A TRUCK CRANE** which can be easily applied to your truck or trailer and with which the driver alone can unload the truck in an hour, is offered by *Bradney Machine Co., Inc.* Called the Priester truck crane, it is simple to operate by merely pushing buttons on the side of the unit. **(116)**

**LAYING BLOCK WALLS** is the subject of this booklet put out by *Louisville Cement Co., Inc.* The type of workmanship recommended for good-looking, strong walls is covered and pictures are profusely used to illustrate good block laying practices. **(117)**

**WATERPROOFING** of concrete, and other surfaces, is affected by Ironite, a metallic water-resistant compound made by the *Ironite Co.* Easily applied with a brush, it is the color of natural brown stone but cold water paint may be applied if other colors are desired. **(118)**

**LOCKER ROOM** design is discussed in this file offered by *The Moore Co.* It gives suggested equipment for maintaining good sanitation, efficiency, and economy in locker rooms with overhead locker-baskets. With this overhead system, clothing is quickly dried and aerated, fresh for the next day. **(119)**

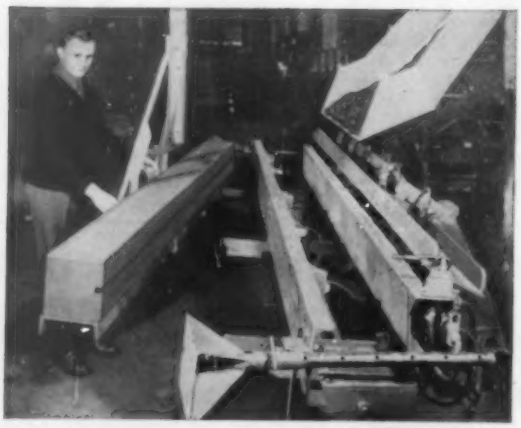
**BOILERS** in the "S" series made by *Wm. Bros Boiler & Mfg. Co.* are listed in this catalog. Complete data and specifications are given on each of the models and sizes in the line, with capacities ranging from 10,800 to 50,000 lb. of steam per hour. **(120)**

**CONVEYING BLOCK** using the Con-Vay-It made by the *American Conveyor Co.*, is faster and more economical than using muscles, says the manufacturer. The 1/3-hp. electric gearhead motor runs the 12 in., 3-ply, rubber-covered rough top belt at a speed of 60 ft. per minute. Easily movable, the unit is rugged and reliable. **(121)**

**2-WAY RADIO** units made by the *General Electric Co.* have been augmented by the addition of a new 15-watt mobile set and a new 15-watt base station unit covering the low band (25-50 mc.). Operable from either a 6- or 12-volt power source, the radio receiver is mounted within one small, sturdy, louverless, completely enclosed housing. **(122)**

**MASONRY SAW BLADE** that is described by its manufacturer, *Construction Machinery Sales Co.*, as being break-proof has been marketed


# There's a Steady Market for KENT-MADE LINTELS and SILLS



Lintelators are available with special motor driven mechanical vibrators which reduce noise.

Write TODAY for the Complete story on KENT LINTELATORS.

**SUPER LINTELATORS**
Make lintels 7⅝" HIGH by 3⅝" 5⅝" 7⅝" 9⅝" 11⅝" WIDE in these lengths.

| | |
|---|---|
| S 6 | 2'8" up to 6' |
| S 7 | 2'8" up to 7'4" |
| S 8 | 2'8" up to 8'8" |
| S 9 | 2'8" up to 9'4" |
| S10 | 2'8" up to 10'8" |

**STANDARD LINTELATORS**
Make lintels 7⅝" HIGH by 3⅝" 5⅝" 7⅝" WIDE in these lengths.

| | |
|---|---|
| No. 6 | 2'8" up to 6' |
| No. 7 | 2'8" up to 7'4" |
| No. 8 | 2'8" up to 8'8" |
| No. 9 | 2'8" up to 9'4" |
| No. 10 | 2'8" up to 10'8" |

Concrete sills and lintels are "pacing" the steady demand for concrete block.

Lower "on the job" installation cost is a strong factor influencing profit conscious builders.

You can do as hundreds of others have and put the complete KENT line of concrete products machinery to work for your "cash" benefit.

You can sell more KENT-MADE blocks, sills and lintels.

**The KENT MACHINE COMPANY**
CONCRETE PRODUCTS MACHINERY
Cuyahoga Falls, Ohio

recently. Internal reinforcing with a special type of fiber glass not only helps give the blade great flexibility and strength, but actually increases the bonding of the abrasive materials. **(123)**

**BLENDING ADDITIVES** with process material is continuously and accurately controlled by a new remote weight-control system made by the *Richardson Scale Co.* It features batch weighing of additives, continuous weighing of process material, and remote selection of weight ratios using a single dial control. **(124)**

**CONCRETE EQUIPMENT** of many varieties — block machines, hand and power strippers, power tampers, and elevator and feeders— are described in this catalog issued by *The Miles Mfg. Co.* The firm guarantees their machines to be exactly as represented and free of defects. **(125)**

**CONCRETE ROOFING TILES** made on ComAco equipment are said by the manufacturer, *Concrete Products Machinery, Inc.*, to yield pound for pound, a higher margin of profit over other precast concrete products. Equipment consists of a 4-point electric vibrator forming table with interchangeable pallets and troweling devices permitting production of all 5 popular styles of roof tile. A minimum investment is required, and patented ComAco equipment is at present being leased on a franchise agreement with territorial protection by the firm. **(126)**

**A WATER TREATMENT,** for boilers, which absorbs the free oxygen (the basic cause of rust formation in boilers) is affected by *Edick Laboratories'* E-D #4. It prevents scale formation which robs boilers of their efficiency. E-D #4 is a concentrated powder which is used at the rate of one lb. per 50 gal. of raw water. **(127)**

**HOISTING MACHINE** with a ready-rigged, self-erecting tower is being manufactured by the *Buck Equipment Corp.* The firm says the Buck Pelican 2,000-lb. capacity hoister can be completely set up in less than 23 minutes. It erects itself to a full 42 ft. unloading height. The unit unfolds like a jackknife and the powered erecting mechanism raises or lowers the tower sections automatically in just 2 minutes 11 seconds. **(128)**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### Basalt Rock Co. Division Acquired by Kaiser Steel

In a multimillion-dollar transaction completed recently a division of the Basalt Rock Company, Napa, Calif., was acquired by the Kaiser Steel Corporation. A. G. Streblow, president of Basalt Rock, stated that the deal, involving the transfer of his firm's steel division, includes two modern plants, located at Napa and Fontana, Calif.

Products of this Basalt Rock division are reinforced concrete pipe, expanded steel line pipe, and electric resistance weld pipe. Other operations of this company, primarily in the field of concrete aggregates, basalite, and related materials, will not be affected by the sale of the steel division. They will remain under the active management of Mr. Streblow, who was one of the firm's founders in 1924.

---

Bruce S. Campbell Sr., president of Harry T. Campbell Sons Corp., Baltimore, Md., has announced that his concern has acquired the assets of the Clark Ready-Mix Concrete Co. The concrete plant will be continued as Clark Concrete, Inc.


"BEST MOLDS we've seen!" . . . that's what producers say about

SCHADE

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MOLDS for ROOF PLANKS

Inquire about availability of EXCLUSIVE FRANCHISES for Users

ALL PATENTS APPLIED FOR

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This widely accepted SCHADE one-piece Form is built to individual measurements . . . constructed with controlled camber . . . lightweight . . . rugged . . . leak-proof . . . self-leveling . . . self-cleaning . . . easily stacked.

Equipped with SCHADE Bowflex Molds, *your* plant will have a big "edge" on local competition! *Write for details and prices.*

*INDUSTRIAL METAL CRAFTSMEN*

THE H. EDWIN SCHADE CO.

*516-22 West Street, Camden 3, N. J.*


### J. W. James Named Director Of Graystone Concrete Co.

John W. James, president and manager of Graystone of Olympia, has been named a director of Graystone Concrete Products Company, Seattle. The Olympia firm is a subsidiary of Graystone Concrete Products.

Mr. James, a graduate of the University of Washington in civil engineering, joined the Graystone organization at Seattle in 1947 as an engineer. Subsequently he was promoted to the position of plant superintendent. He was transferred to the Olympia operation two years ago, to become president and manager there.

---

Elmer Banqus has announced the sale of his concrete and sand and gravel concern, Red-E-Mix Concrete Company, Brookings, Oreg., to Thomas M. McKenzie of Grants Pass, Oreg. The firm will continue to be known by its former name.

---

The following officers were elected recently for the Raymond Concrete Pile Company of New York: Myron W. Krueger, executive vice-president; Donald W. Moss, James Pinnell, and Herbert M. Crowley, vice-presidents.

---

An extended, revised third edition of Gustave Magnel's manual, *Prestressed Concrete,* has been published. The volume covers principles, methods of design, studies of tests in the laboratory and field, and actual applications of prestressed concrete. Published by the McGraw-Hill Book Company, New York. Price, $8 per copy.

---

A color movie entitled *The Changing South* has been released by the Solite Corporation, Richmond, Va. The film features the use of Solite, a lightweight aggregate, in the building boom in the South. According to Solite officials, a black-and-white version is available for televising.

---

John W. Brown, founder of the Canada Block and Tile Company, Toronto, Ont., died on April 23 at his home in that city.

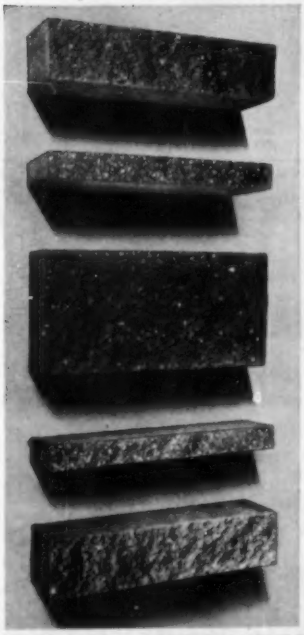
---

Palmetto Quarries Company, Columbia, S. C., has purchased the Concrete Block Division of the Dobbs Company, Charleston, S. C.

# BES-STONE *Split Block* MAKES the Difference

* Advances architectural design and beauty

* BOOSTS YOUR PROFITS!



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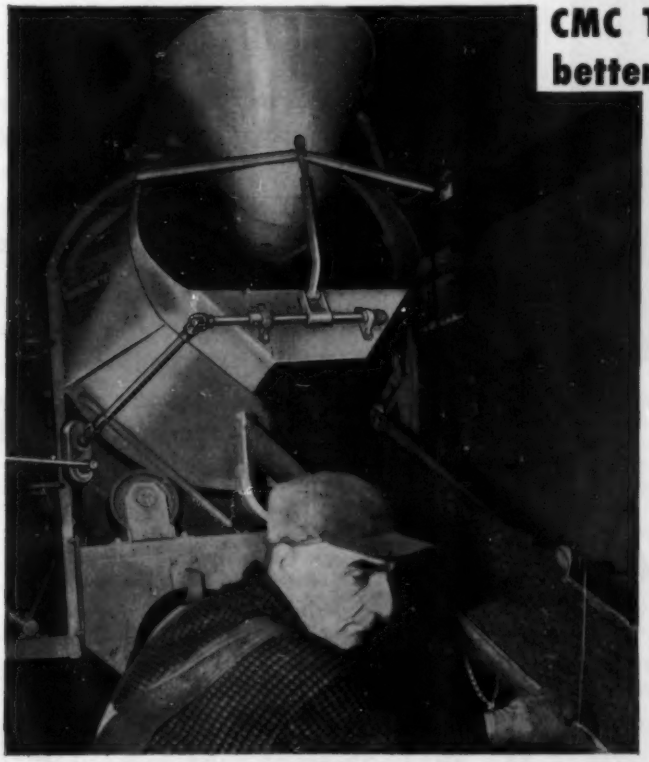

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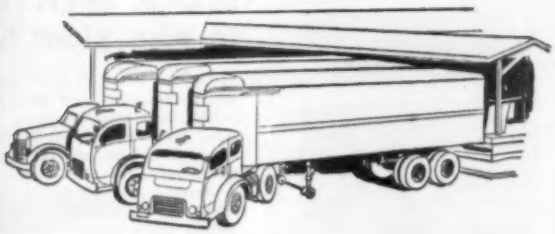

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Weight only 50 oz. 6 in. length, fits hand easily. Exclusive metering trigger delivers 0 to 9000 blows per minute. 28 tools available for 100 different jobs. Special tools made at your request.

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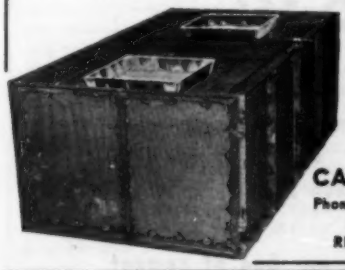
and Handling Equipment offer a proven method of boosting your concrete profits. Make a quality product on a large scale, high-economy basis. ONE MAN handles our Delivery Rig. Satisfied customers from coast to coast.



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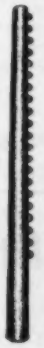

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Cedar Falls, Iowa

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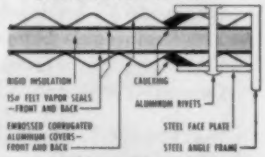
*Above: Rugged Universal Curing Room Doors and Door Carrier equipment in use at the Union Concrete Pipe Co., Ceredo, West Virginia.*

**PARTIAL DOOR SECTION**

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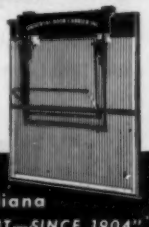

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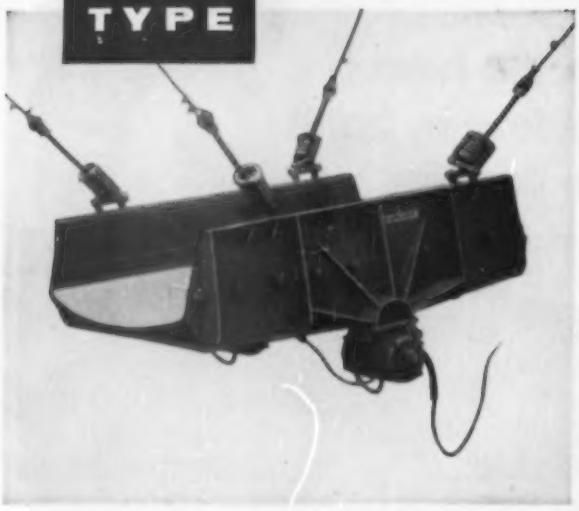

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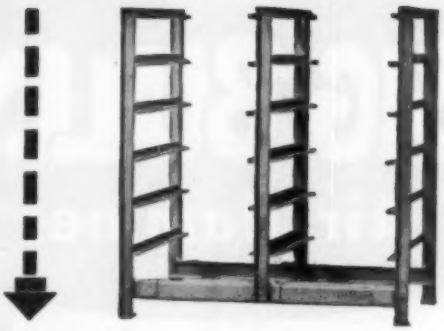

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**Brikcrete Machine**
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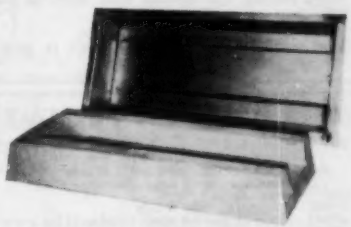

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**Lot 103** (Can be seen in operation.)
1—Multico No. 2 Blockmaster (two block per cycle) and Electric Off-Bearer
5—Mold Boxes—equipment for 4", 6", 8", 10", 12", 8" F.H.A., 6" F.H.A. and chimney block
1500—Steel Pallets, 18" x 18" x ¼"
42—Racks, 72-block capacity

**Lots 106-7-8** (One can be seen in operation.)
3—Multico No. 3 Blockmasters (three block per cycle)

**Lot 109**
1—Multico No. 3 Blockmaster (three block per cycle) with Front-End Loader, Automatic Pallet Feeder and Hydraulic Off-Bearer

**Lot 110**
1—Multico No. 3 Blockmaster (three block per cycle) with Electric Off-Bearer
4—Mold Boxes: 4", 6", 8" and 12"
1500—Steel Pallets, 18½" x 26" x 5/16"
70—Racks, 72-block capacity
1—50 Cu. Ft. Mixer

***INVESTIGATE—Put yourself in a competitive position.***

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**FOR SALE**

Besser Super Vibrapac Block Machine with 4", 6", 8", and 12" attachments, pallets, and racks.

**Concrete Products Supply Co.**
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10,000 used steel pallets, 17"x27"x¼" for Besser Cement Block Machine—$1.25 each FOB Miami. For further particulars communicate Purchasing Department.

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## FOR SALE

**Stearns Model 15 Block Machine Complete with Automatic Pallet Return, Oiler, Magnetic Off-bearer and Attachments for 4, 8 and 12" block, brick and half height, also a quantity of spare parts. Equipment originally cost $42,000.00 new, late 1950. In excellent condition, priced for prompt sale.**

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**431 S. Dearborn St. Chicago 5, Illinois**

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**PRESTRESSED CONCRETE FRANCHISE**

Lakeland Engineering Associates' proven designs for floor slabs, roof deck, joists, beams, bleachers, and bridge decks, available for manufacturing under L E A P exclusive franchise. Write for details.

**LAKELAND ENGINEERING ASSOCIATES, INC.**
**Lakeland, Florida**

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**WANTED**

Continuous-mix pugmill, with or without drive. Aggregate bins and cement bins with feeders.

**POZZOLAN PRODUCTS CO., INC.**
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**FOR SALE**

3—Pallet returns for Besser Vibrapac Block Machine.
3—Off-bearing hoists for Besser Vibrapac Block Machine.
Off-bearer handles 2 pallets at a time.
Priced For Quick Sale—Call or Write

**Anchor Concrete Products, Inc.**
**2450 William St. Buffalo 6, New York**
**Grant N. Reinhold — HUmboldt 3132**

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**FOR SALE**

Used Aluminum Molds—Better Than New.
1—Beautiful Bird Bath Mold. The method makes you an expert.
1—Rustic Design Flower Box. Instructions given how to keep mold in continuous operation. (We make 10 boxes an hour.)
Molds $150.00—Instructions priceless.

**Pottery, Box 85, West Berlin, N. J.**

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**FOR SALE**

Kent air-operated machine with Kelly tamper, 8" and 12" attachments, sash and corner, 3,500 8" pallets, 500 12" pallets. Also cesspool block attachments. One belt concrete conveyor 18"x14' with clutch — $2500.

**CENTER MORICHES CEMENT PRODUCTS**
**Center Moriches, N. Y.**

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## MINERAL COLORS
for
## BRICK MORTAR STUCCO-PLASTER-CONCRETE

*"Fine Because of Their Fineness"*
*Ask for samples and recommendations.*
**BLUE RIDGE TALC CO., INC.**
**HENRY, VIRGINIA**

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**FOR SALE**

Besser Super Vibrapac. Excellent condition. 30" Gardner Double Spindle Grinder. Block racks 72—8" block per rack.

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## STOP that WATER

**With FORMULA NO. 640**

A clear liquid which penetrates 1" or more into concrete, brick, stucco, etc., seals—holds 1250 lbs. per sq. ft. hydrostatic pressure. Cuts costs: Applies quickly — no mixing — no cleanup — no furring — no membranes. Write for technical data—free sample.

**HAYNES PRODUCTS CO., OMAHA 3, NEBR.**

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**P. O. BOX 452**
SIOUX CITY, IOWA, U.S.A.
***Concrete Pipe Forms & Vibrators***

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Classified advertising space in the industry's widest-read magazine—only $11.00 per column inch.

**THE CONCRETE MANUFACTURER**
**431 S. Dearborn St. Chicago 5, Ill.**

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**FOR SALE**

1200 block per day capacity cinder and cement block plant with Bartile cement roofing tile equipment. Only cinder block plant in this trade territory. Low non-union labor. Town of 12000 on east slope of Rockies. Wonderful climate. All year round construction.

**HALL CONCRETE PRODUCTS CO.**
**CANON CITY, COLO.**

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**FOR SALE**

Stearns #9 Joltcrete with 4", 6", and 8" attachments and pressed steel pallets, complete with base and offbearer. Very good condition.

**CONCRETE PRODUCTS SUPPLY CO.**
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**FOR SALE**

F. C. George Presspac Concrete Block Machine available immediately. Only used two years. Can be seen in use. Equipped with 8" Mould Box, 4" solid block, bull nose and sash attachments. Price $900.00.

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Fork and platform power lift trucks, used and guaranteed factory rebuilts.

**ERICKSON POWER LIFT TRUCKS, INC.**
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**FOR SALE**

**#9 Stearns Joltcrete block machine with moulds and steel pallets to make 4", 6", 8", 12", and 8" header block. Racks, pneumatic off bearer, pallet oiler, turn tables, and spare parts. This equipment is all in very good condition and operating daily. We are installing new equipment and will sell at a sacrifice.**

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**P. O. Box 441 Phone 988**
**Springfield, Tennessee**

# SIDE-O-MATIC

LOWERS BLOCKS INTO BASEMENTS AND UNLOADS ON BOTH SIDES AND REAR

We design the fork to handle your present size cubes—you don't have to change your cubing set-up. Hauls full-capacity loads up to 864—8" x 8" x 16" blocks.

*FOR FULL DETAILS AND PRICES Write or Phone:*

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Associated with YORK STONE & SUPPLY CO., York, Pa. — Phone 7357

*Patents Applied For*

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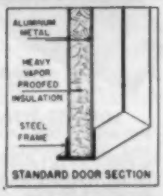
**SAVE FUEL • REDUCE CURING TIME**
**CUT COSTS • UP PROFITS**
**with *Standard* KILN DOORS!**

**WHERE AISLE SPACE IS LIMITED** STANDARD sliding doors need no aisle space. The carrier-type door (shown) requires 15" minimum clearance above top of door opening. A vertical sliding door, counterweighted for easy opening, is also available.

**WHERE HINGE-TYPE DOORS ARE PREFERRED** Choose from two STANDARD hinge-type doors. The top-hinging door (shown) can be used when there's insufficient room at sides of door. The conventional side-hinging door has rugged hinges and positive-seal lock.

**CHECK THESE FEATURES**

- √ **Heavy Aluminum Sheets on Both Sides of Thick Vapor Proofed Insulation.**
- √ **Rugged Steel Frame.**



STANDARD DOOR SECTION

*Get the Best — Send for Details Now*
**STANDARD DRY KILN COMPANY**
P. O. BOX 5708 . . . . INDIANAPOLIS 21, IND.

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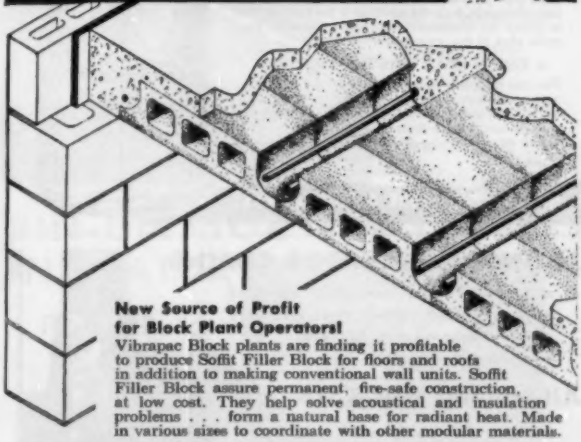
**Give them BOTH-**

**VIBRAPAC** Block for Walls
**SOFFIT** Block for Floors



**New Source of Profit for Block Plant Operators!**
Vibrapac Block plants are finding it profitable to produce Soffit Filler Block for floors and roofs in addition to making conventional wall units. Soffit Filler Block assure permanent, fire-safe construction, at low cost. They help solve acoustical and insulation problems . . . form a natural base for radiant heat. Made in various sizes to coordinate with other modular materials.

**VIBRAPACS are Versatile!**
All types and sizes of block, as well as Soffit Floor Filler Block, are made on a Besser Vibrapac, using the same set of Plain Pallets. Fully automatic. No machine operator is required. Write for literature.

**BESSER COMPANY**
ALPENA, MICHIGAN, U. S. A.
*Complete Equipment for Concrete Block Plants*

A 8168-¼

# MANPOWER goes twice as far

## . . . when it works with the HYDRO-LIFT UNLOADER

Most practical block unloader on market.

Permits delivering as many blocks as 2 or 3 men unloading by hand.

Positive hydraulic-power driven by engine power take-off.

No gasoline engine or electric motor power failure.

Perfect control of load at all times.

Reduces truck investment 50%.

Economical operation—low maintenance.

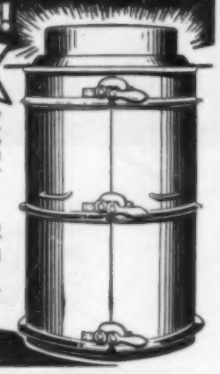
PATENT PENDING

*PRICE WITHIN BUDGET OF EVERY MANUFACTURER*

**Write G & H MACHINE COMPANY • P. O. Box #38 • Columbia, Pennsylvania**

## FOR THE FINEST CONCRETE PIPE... YOU NEED FINEST FORMS!

THE Quinn Standard



Backed by over 40 years of reliable service, the QUINN STANDARD is recognized as the finest concrete pipe form the world over. Thousands of pipe manufacturers, from the smallest to the largest, look to Quinn for equipment to produce the finest concrete pipe at the lowest possible costs.

• **QUINN HEAVY DUTY PIPE FORMS**

For making pipe by hand methods by either the wet or semi-dry process. Sizes for pipe from 10" to 120" and larger. Tongue and groove or bell end pipe in any length desired.

*WRITE TODAY for complete information and estimates.*

Also manufacturers of QUINN CONCRETE PIPE MACHINES

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BOONE, IOWA

## JOHNSON ELEVATOR CHAINS

- long-life carburized steel knuckles
- medium-high carbon steel side bars
- alloy heat-treated ⅛" pins
- welded bucket lugs

## *All-welded* BUCKETS

- light, durable, smooth
- fill fast, clean fast
- heavy gauge lips, ends
- cement: 10x6, 12x7, 14x7"
- agg.: 10x6, 12x8, 14x8, 16x8"

to: C. S. JOHNSON CO. Champaign, Illinois

Send information on: ☐ buckets ☐ elevator chains

NAME .....

STREET .....

CITY, STATE ..... J342REV. PQ

## Palm-coated gloves for concrete products plants

**LONGEST WEAR**
By actual test, Nos. 31 and 304 Monkey Grip, with "triple-thick" palm, outwear all others handling block.

**Tougher than leather. Comfortable as canvas.**

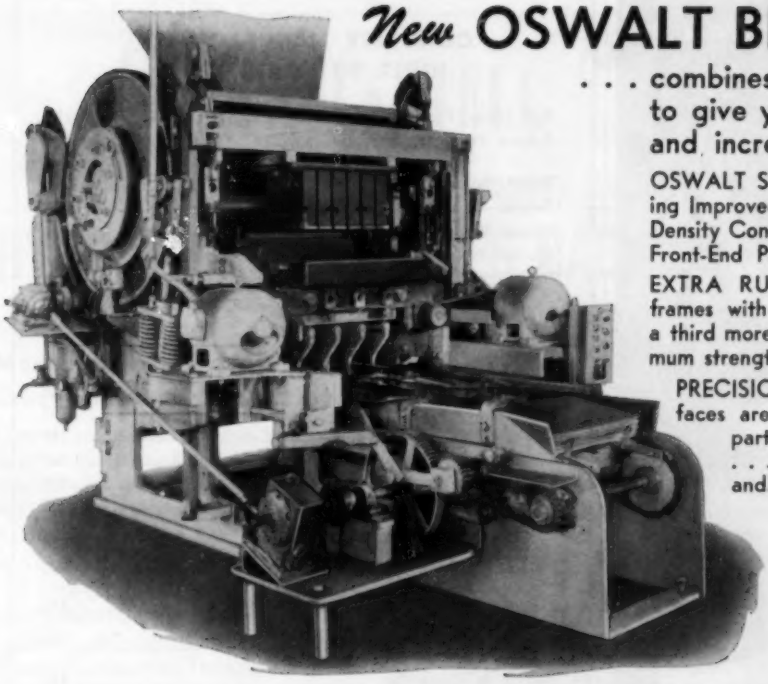
**No. 61-W Grab-it,** with extra cool vent-back and rough textured non-slip natural rubber coated palm, is job-fitted for handling bagged cement, other slippery materials and sharp cinder block. Also available with full fabric back.

**No. 30 Monkey Grip,** with plastic coated palm, is job-fitted for handling most concrete products and greased pallets.

**Free Test Offer to Employers:** Tell us your operation. Without cost we will recommend and supply samples of the glove that best fits your job.

**Edmont Manufacturing Co.**
**1208 Walnut St., Coshocton, Ohio**

Edmont JOB-FITTED GLOVES



# *New* OSWALT BLOCK MACHINE

. . . combines many advanced features to give you top-level plant efficiency and increased production.

OSWALT SERVICES are built-in complete, including Improved Vibration, new Simplified Height and Density Control, New Shock-Free Block Ejector and Front-End Pallet Feeder.

EXTRA RUGGED CONSTRUCTION: Thicker frames with full 2" metal; Wider pedestals, and a third more metal in main members . . . for maximum strength and stability.

PRECISION WORKMANSHIP: All joined surfaces are machined to precision fit. Working parts are heat treated and stress relieved . . . so block machine operates in natural and relaxed condition, insuring longer life, lower maintenance and better service.

See the OSWALT BLOCK MACHINE in operation at our new plant. It is setting new records in block production without sacrifice of quality. Write for details.

## OSWALT ENGINEERING SERVICE CORP.

**1335 Circle Avenue, Forest Park, Ill.** **Phones: EStebrook 8-3666, FOrest 6-3898**

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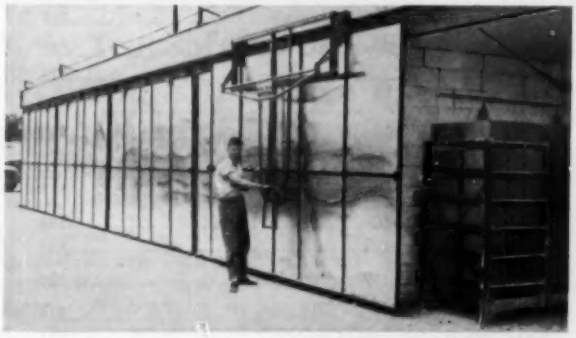
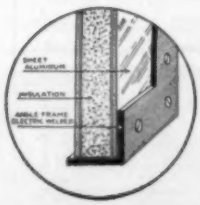


Moore Carrier-type Doors at Albany (Ga.) Concrete Prod. Co.

## Moore Metal-Insulated Kiln Doors Save Fuel—Reduce Curing Time



Keep heat where it belongs—inside the kiln—with Moore Aluminum-Insulated Doors. They improve curing conditions—save steam—last longer.

Send us dimensions of present door openings for quotation.

**MOORE DRY KILN COMPANY**

Oldest and Largest Manufacturers of Dry Kilns and Veneer Dryers

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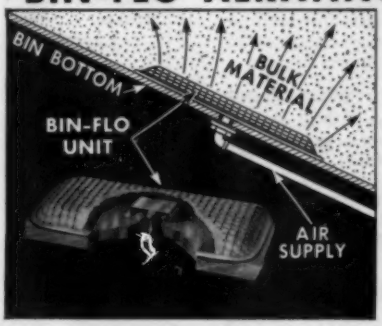
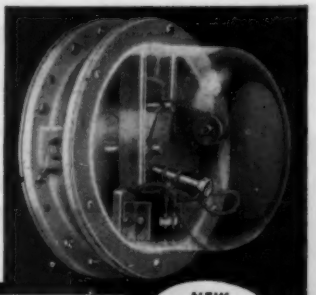
## BIN-FLO AERATING UNIT




**Provides Steady Flow of Dry, Finely Ground Materials which tend to bridge in storage. Uses only small amount low-pressure air.**

## BIN-DICATOR BIN LEVEL INDICATOR

**For All Bulk Materials**



**signals change in level; automatically starts and stops filling and emptying equipment.**

**THE BIN-DICATOR CO.**

**13946-W1 Kercheval • Detroit 15, Mich.**

**NEW DETAIL DATA BOOK FREE**

# NEW! *Profitable lease or purchase plan . . .*

## *to Manufacture*

## WORLD'S FINEST *Concrete* ROOFING TILE

PROFITABLE OPPORTUNITY is now available to manufacture COMACO Shake-Tile. Patented machinery, molds and formulas can be leased or purchased on five year payment plan. Manufacturers will be licensed to make and sell this highly profitable life-time roofing material. It's the World's finest!

**COMACO CONCRETE SHAKE-TILE**

Six beautiful styles and many colors make COMACO Shake-Tile the preferred roofing material for all homes, schools, churches and institutional buildings. Approved by architects, it meets the specifications of local, state and Federal codes.

**PATENTED PROCESS—NO OVEN CURING**

Process developed during past 12 years is simple and fast, permitting large profitable production. No competition. Here's the chance of a lifetime to be first in your market with a nationally accepted, architect approved building material. Write for complete information about five-year lease or purchase plan.

**CONCRETE PRODUCTS MACHINERY CO., INC.**
**1930 Wilshire Blvd., Los Angeles, California**

**COMACO®**
**CONCRETE SHAKE-TILE ROOFING**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# TRUCKSTELL ON THE JOB NEWS

THE FINEST IN *ENGINEERED FOR-THE-JOB* TRUCK EQUIPMENT

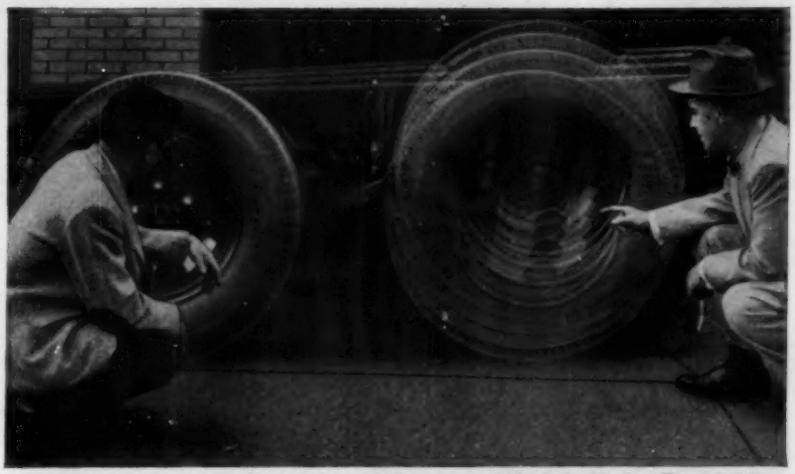
# HYDRO-TRAC PROVIDES CAB-CONTROLLED TRACTION

### Maximum Payload Capacity; More Work Miles per Day; Greater Tire and Gas Savings!

Operators on many types of 6-wheel hauls—dump, tank, lumber, van, semi-tractor—report that their Truckstell-Willock Hydro-Trac Trailing 3rd Axles are hitting new performance and economy highs.

Hydro-Trac supplies 50-50 axle load distribution for greatest payloads, up to 80-20 *cab-controlled* distribution for maximum traction, trailing axle up for fast, economical return trips, empty.

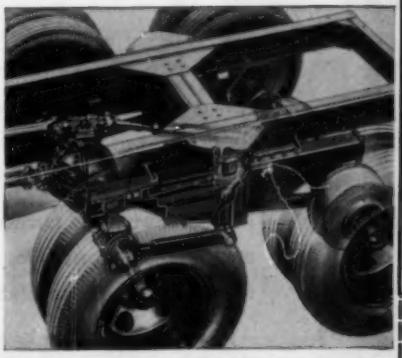
Weight is shifted hydraulically by quick-acting, cab-controlled pump. Less weight, less cost, more payload, more profit. Models engineered for all makes of trucks and types of drives!



**To get extra traction, driver can transfer up to 60% of the Hydro-Trac Axle's load to the driving axle . . . providing highway traction equal to a dual-axle drive, at far less cost. As stop-motion picture shows, axle can be raised off road when truck is empty, giving single-axle advantages on return trips.**

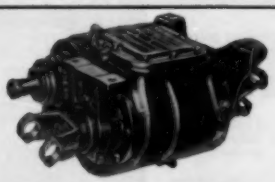
## New Truckstell Dual-Axle Drive Suspension Cushions the Ride and Actually Steers!

### Truckstell combines Tandem-Trac Suspension with its 3-Speed Power Divider



Engineered for rugged dual-axle jobs, Truckstell keeps tandem wheels tracking on straightaways, guides them on curves. Variable rate, 2-stage springs give gentle cushioning whether truck is empty or heavy laden. Of rocking-chair bearing design, there's nothing to wear out, no need for lubrication ever!

All the auxiliary gearing needed for added gear splits is provided by the 3 gear ratios built in the Power Divider's single gearbox. Single- or dual-axle drive selection can be made instantly, at any speed. Low in cost, high in capacity, light in weight, engineered to fit your specific jobs.



### 3-Speed Auxiliary Now Available With Built-In Power Take-Off

Ideal for mounting under cab. Designed for those who need extra power and gear splits . . . plus full engine torque, variable speed P. T. O. easily accessible to all power-operated units! Optional gear-ratio combinations available!

### Swivel Frame Increases Traction, Maneuverability, Driving Ease

Permits the front and rear halves of a truck to rotate independently. Inexpensive, strong, and light in weight. All wheels are kept firmly on ground. Frame stress and steering wheel fight are eliminated. Maneuverability and traction increased! Models available for all make trucks, ½ ton and up.

**Truckstell Manufacturing Company**
**Dept. O-21, Union Commerce Building**
**Cleveland 14, Ohio**

Rush me complete information on the following Truckstell products I've checked.

☐ Dual-Axle Drive ☐ Swivel Frame

☐ Hydro-Trac 3rd Axle ☐ Auxiliary and P.T.O.

Name_____

Firm_____

Address_____

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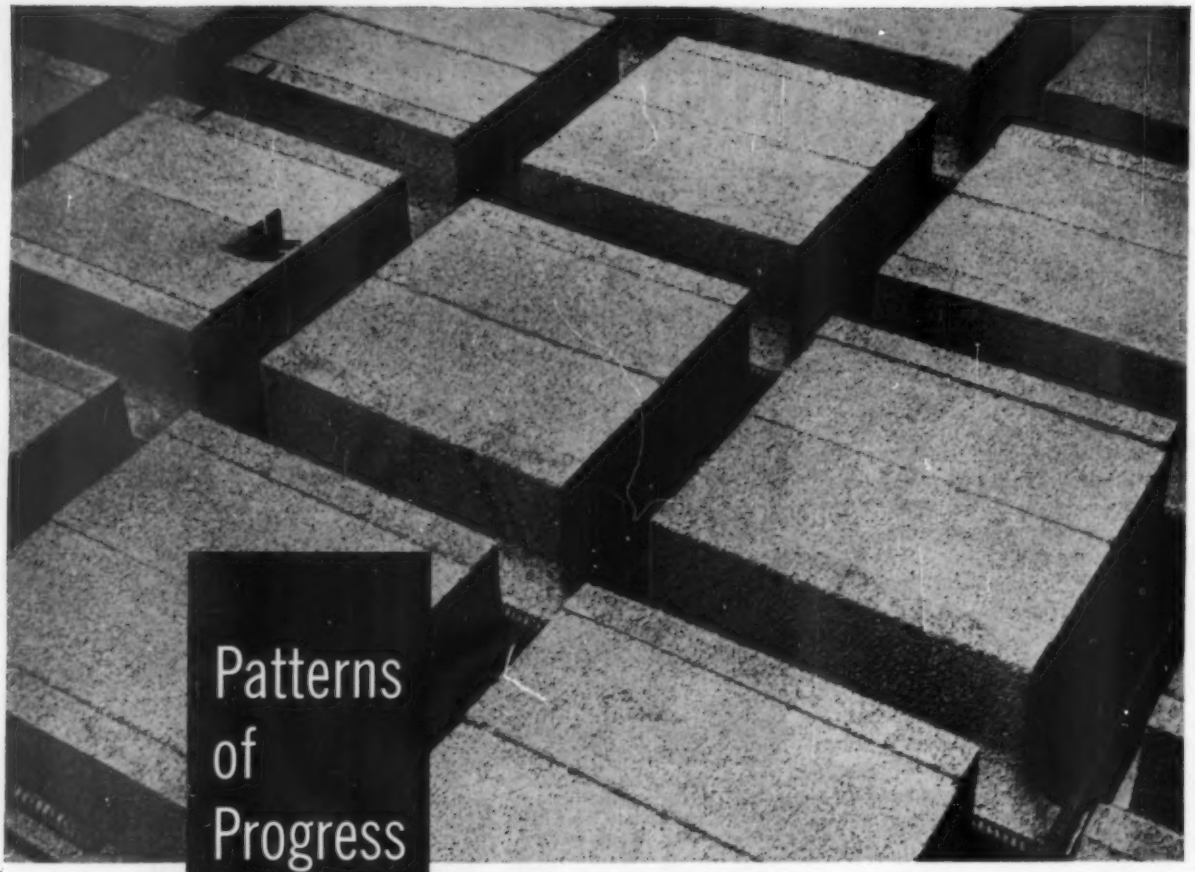

# Patterns of Progress

Lightweight concrete blocks in position before placing reinforcing and concrete to form a Youtz-Slick lift slab.

Limestone Township H.S., Bartonville, Ill.

Contractor:
**C. Iber & Sons, Inc.**
Peoria, Ill.

Architect:
**Hewitt and Bastian**
Peoria, Ill.

Concrete Units:
**Irions Concrete Block Co.**
Chillicothe, Ill.

Dealer:
**Builders Products Co.**
E. Peoria, Ill.

As an integral part of the slab, the blocks form a waffle ceiling with acoustical properties.

## for the Concrete Products Manufacturer

Modern designs using new and out-of-the-ordinary applications of concrete units make patterns of progress for the resourceful concrete products manufacturer. The unique waffle ceiling formed by this lift slab design is an indication of things to come in the ever-expanding construction picture.

In your own sales territory, a study of construction needs may reveal opportunities never thought of before . . . ready to pay off in easy profitable sales for you.

And remember, to make products that give complete satisfaction, include Lehigh Cements in your plans. There's a Lehigh Cement to help you produce quality units with any manufacturing process.

**LEHIGH**
PORTLAND CEMENT COMPANY
*Allentown, Pa.*

LEHIGH PORTLAND CEMENT · LEHIGH EARLY STRENGTH CEMENT
LEHIGH AIR-ENTRAINING CEMENTS · LEHIGH MORTAR CEMENT

# 12 MEN WITH BUT A SINGLE MISSION
## TO HELP LITH-I-BLOCK USERS MAKE MORE MONEY

**Conveniently located all over the country, they are at your call — for help, advice or instruction**

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BONUS QUALITY
LITH-I-BLOCK
MADE ONLY ON THE LITH-I-BLOCK MACHINE

**SEND THE COUPON — GET THE DETAILS ON HOW THEY CAN HELP YOU**

ONE PIECE OF EQUIPMENT OR A COMPLETE PLANT LAYOUT

# LITH-I-BAR CO.

## HOLLAND, MICHIGAN

*SALES AND SERVICE THE WORLD OVER*

**LITH-I-BAR CO.** **HOLLAND, MICH.**

I want to know more about the Lith-I-Block story — send bulletins 101-3

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Company_____

Address_____

City & State_____

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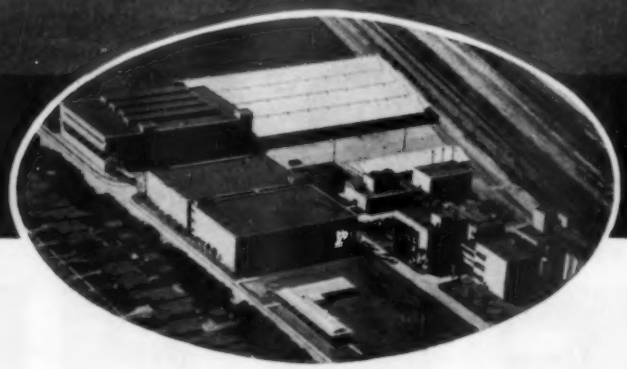
Archts.—Harley, Ellington & Day, Detroit
Consltg. Struct. Engrs.—Brandow & Johnston, Los Angeles
Gen. Contr.—P. J. Walker Co., Los Angeles
Pozzolith Ready-Mixed Concrete supplied by Arrow Rock Co., Sun Valley, California



# Architectural Concrete with POZZOLITH...

- good appearance
- minimum shrinkage
- low permeability
- great durability
- high bond-to-steel

**Pozzolith has been employed, since 1932, in the construction of many architectural concrete buildings to help avoid honeycombing and other segregation defects.**

**A better surface is obtained with Pozzolith because it produces greater cohesiveness and plasticity...even when water is substantially reduced.**

**By improving the *plastic* properties of concrete—with lower unit water content—Pozzolith also improves the *hardened* properties. This is because unit water content is the most important basic factor affecting the quality of concrete, according to leading concrete authorities.***

**Any one of our 70 experienced field technical men will be glad to demonstrate the full advantages of Pozzolith for your job.**

***American Concrete Institute, Committee 613, 1944 Report, Page 655**
**Bureau of Reclamation's current Concrete Manual, Page 130**

## The MASTER BUILDERS Co.

MASTER BUILDERS PRODUCT

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Subsidiary of American-Marietta Company

Cable Address, Mastmethod, New York

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***CLOSING DATE: 20th OF THE MONTH PRECEDING DATE OF PUBLICATION.***

## SALES ENGINEER

Progressive, small manufacturer needs sales engineer to assist dealers in sale of crushing machinery. Successful experience in sale of stationary and portable rock crushing equipment essential. Salary will depend on capability and previous experience. Considerable travel required. Will be located at factory in medium size Missouri city. The right man may expect to be established as a district manager on salary plus incentive basis within a reasonable time. Age 30 to 45 preferably. Please include recent photograph and complete information on age, education and experience in application. All correspondence will be strictly confidential and references will not be contacted without your permission.

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Experienced in crushed rock operations. Prefer college background. Excellent Future. Send full data on past employment with positions held, pay and reasons for leaving. Inquiries will be confidential.

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**MINE MASTER MECHANIC**

Age limit 48. Should be competent supervisor with practical ability required to operate local mine shops and surface equipment and to routinely maintain surface and underground equipment. Local facilities backed up by heavy duty general shops for major repairs.

Forward with initial reply complete educational and experience records, list of references, age, marital status, number and age of children, photo (optional). Company offers three year contract, furnished house, transportation self and family, liberal vacations. Excellent climate, living conditions, medical and hospital facilities. School to 14 years. Non-contributory pension plan. Salary open.

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PRECISION CHEMICAL ANALYSIS OF RARE AND COMMON MINERALS, ORES AND CONCENTRATES. CARBONATE, PHOSPHATE AND SILICATE ROCKS.

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**Consulting Chemist**
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## CRUSHER HAMMER TYPE

Hopper opening 24 x 24, Dixie Mfg. Co., 40 HP. Westinghouse motor and control blower.

**Aljon Electric Diesel Co.**
904 Pacific St. - Brooklyn 38, N. Y.
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*Quarries*
*Crushing Plants*
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*Storage Methods*
*Operating Costs*

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***Operating Lease or Sale***

Sinter installation—ready to go—located in a major market—middle west—needs operating management and cash.

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Direct connected to 300 HP. Motor 2300 Volts, 3 phase, 60 cycle.

**H. P. GUION**
**CI. 6-0910—DREDGE BROKER**
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**Track Accessories**
***All Sizes***

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Want men interested in being employed by small aggressive lightweight aggregate producer in the east. We have openings for qualified applicants who have experience in sales, engineering, and production. Applicant must have at least 5 years experience in a field that will have given him the necessary capabilities. In reply state age, education, experience, present employment, personal data, and salary expected. Replies confidential.

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Complete setup with 20 cast aluminum moulds and supplies for the manufacture of cement laundry trays or sinks, both double and single size units. Must be disposed of fast at a special reduced rate. $4,000.

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**Kenmore 6-8177**

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**Find the Gravel, Sand, Rock, Clay**
**AND OTHER MINERAL DEPOSITS**
***NEAREST YOUR USE POINTS***

**Enormous savings on big cubic yardage of aggregate and borrow**

Using low-cost, confidential geological research with study of pedological and subsurface data and often the interpretation of air photography, (all available for most U. S. areas) our geologists prospect in the office subject to field tests. Slow costly ground reconnaissance eliminated. ☆ An explanation of your needs written on your business letterhead with any map marked to indicate area in which deposits are wanted, brings complete information and proposal on suitable work for you. No obligation. Dept. PQ-2

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***1200 Fifteenth Street N. W. WASHINGTON 5, D. C.***

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***Portable, 2-stage***

500′ Ing. Rand Mdl. K500, 100#, 6 cyl. Wauk.-Hesselman Diesel eng., 4 pneu. tires, hydraulic clutch.

315′ Ing. Rand, Waukesha gas eng., 4 steel wheels, bargain.

210′ Chgo. Pneu., Hercules gas eng., 4 pneu, tires.

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100 Ton, 66 yd., Butler 3-compartment bin, w/center compt. arranged for handling cement, weigh-batcher, scale, etc.

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Mead Morrison drum type, 7½ HP. and 15 HP., 3/60/220; two units—4200# to 15,000# linepull.

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1½ yd. Mdl. 77 Lorain #9163, D13000 Cat. Diesel, 45-85′ boom, 20′ jib, wt. 40 ton.

¾ yd. Mdl. 304 Koehring #C5934, 30-50′ boom.

Mdl. 255A P&H #8243, 30-40′ boom, Chrysler 8 cyl. gas eng., cap. 16,900#.

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30 ton Mdl. F OHIO #3266, 50′ boom, oil fired, Nat'l. Bd. 200# boiler, beautiful shape, good buy.

**DERRICKS**

20 ton American Terry Steel Erectors Guy Derrick, 110′ mast, 100′ boom.

4 ton Ingram Steel Stiffleg, for hook work, 23′8″ mast, 50′ boom, cap. 4 ton @ 28′, tested to 8 ton. With or w/o gas hoist & swinger.

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American 2/drum 2/speed dragscraper hoists, 125 HP. 3/60/220 slipring, steel gears, rear drum 18,750# @ 200 FPM. or 6600# @ 570 FPM. Front drum 37,500# @ 100 FPM. or 14,000# @ 270 FPM. Wt. 19,200#. Fine shape.

**HOISTS—*Gas, Elec., Steam***

We have an excellent selection of good Gasoline, Electric, Steam and Diesel Hoists, from to 4/drum, all sizes and types.

**PUMPS—*Electric & Gas***

12″ Dayton Dowd, centrif., vertical, 50 HP., 3/60/220/440, 6000 GPM. @ 19′, 4250 GPM. @ 32′.

8″ Mdl. 125 M. Gorman Rupp, Hercules 6 cyl. gas eng., rated 2300 GPM. @ 20′ to 600 GPM. @ 110′, on 4 steel wheels.

**THIS MONTH'S SPECIALS**

***MIXER, STATIONARY, 1 YD.***

**28-S Jaeger Concrete Mixer, electric powered, rebuilt, bargain.**

***Partial list . . . If your needs aren't listed, please contact nearest ECA sales office.***

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EQUIPMENT CORPORATION OF AMERICA

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WOrth 2-0036

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**JAW CRUSHERS — 6" x 3" to 60" x 48"**

***Before buying or selling any FARREL-BACON JAW CRUSHERS it will pay you to consult***

**BACON-PIETSCH Co., Inc.**
*Engineers & Manufacturers* — *Send for Catalogue*

75 No. Maple Avenue
Ridgewood, New Jersey
Phone: Gilbert 5-3700

**Machine Shop Facilities**
**FEEDERS**
**Conveyors, Screens, etc.**

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**FOR SALE**

1—150 H.P. Sauerman Slackline Cableway, Electric power, Dual drum hoist, controls; 100 ft. mast, blocks, bridle & bucket carrier, 1½ yd. bucket. All new 1½″ & 1¼″ guy cables.

Price.....$4000.00

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Large selection of
**USED** and
RECONDITIONED

# motors

We have a large selection of drip proof, open, or totally enclosed motors — 5 to 75 H.P. — 1 or 3 phase — 60 cycle — 450 to 1800 R.P.M. — ball or sleeve bearing — 110/220, 220, 220/440 or 440 volts. All are products of such leading manufacturers as GE, Westinghouse, Allis-Chalmers, Fairbanks-Morse, Century, Master, Lincoln, Wagner, Robbins and Myers, Cleveland Electric, Burke and Howell. All are reasonably priced for clearance.

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Springfield, Ohio

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**Springfield, Ohio**

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30 HP. 200 lb. pressure E. C. Boiler.
150 HP. Diesel Pwr. Unit w/clutch.
10 HP. Dust Collector & Exhauster.
18″x25′ B/G Portable Conveyor w/mtr.
100 HP. 600 RPM. GE Motor—Rebuilt.
36″ Belt Conveyors—108′ & 60′ long.
6″ Pump for Dredging & Irrigating.
#848 B/G Asphalt Mixing Unit.
**H. & P., 6719 Etzel, St. Louis 14, Mo.**

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**Tie Plates — Spikes — Frogs & Switches, etc.**

**W. H. DYER CO., INC.**
**2110-P Railway Exchange Bldg.**
**St. Louis, Mo.**
**Stocks at Various Points. Quick Service.**

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**SURPLUS EQUIPMENT WILL SACRIFICE**

1—Used P. & H. Model 1055 Standard Shovel, 3⅛ Cu. Yd. Dipper, Caterpillar D-364 Diesel Engine. Parts & Tools. Good Condition.
1—Used 75C Haiss Material Loader, Self-propelled, Gas Engine. Good Condition.
1—Used Bucyrus Armstrong, Model 29-T, Electric Churn Drill, Parts & Tools. Good Condition.
1—Used Bucyrus Armstrong, Model 27-T Electric Churn Drill, Parts & Tools. Good Condition.
1—New Bucyrus Erie, Model 12, Electric Bit Dresser. Combination 10-10A. Tools. Never used.
1—Used Bucyrus Armstrong No. 8 Electric Bit Dresser & Blower. Good Condition.

**BIG ROCK STONE & MATERIAL COMPANY**
**Little Rock, Arkansas**

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**NORTHWEST "25"**
¾ yd. Dragline, 40′ boom, Caterpillar Diesel Power. A Bargain @ $8500.

**UNIT "514"**
½ yd. Trench Hoe, Chrysler gas power. Reconditioned & Guaranteed.

**INSLEY "L"**
¾ yd. Trench Hoe, 3 years old @ $8500.

**BURMEISTER**
New 75-Ton Aggregate Bin w/aggregate Batcher, Scales, Cement Batcher w/scales, collecting Hopper. Immediate delivery.

**NEW HOLLAND**
Portable Crushing & Screening Plant, w/Impact Crusher, Screen, Diesel Power, etc. @ $20,000.

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**Rockford, Illinois** **Phone 4-6706**

**SPECIALS**

1—Allis-Chalmers 9'x7'x22' two compartment mill and motor
2—New 6½'x150' Kilns
1—New Traylor 5'-6" T.Y. Gyratory Crusher
1—125 HP—3/60/440V—450 RPM Squirrel Cage Motor
1—Complete Lime Hydrating Plant
1—Complete Plant consisting of 4½'x40' Kiln, 3'x 30' Cooler, Supporting Steel Framework, Motors, Fans, Dust Collectors, etc.
1—#6 Williams Hammermill

**KILNS**

1—4'x40', 7'x120', 8'x125', 8'x150' Kilns

**DRYERS**

1—4½'x30', 5½'x40', 6'x40', 6'x60' 8'x70', 8'x125'.

**CRUSHERS**

1—42"x48", 40"x42", 36"x42", 30"x36", 24"x36", 16"x36", 13"x24" Jaw Crushers
2—42"x16" Allis-Chalmers Crushing Rolls
1—36"x16" Sturtevant Crushing Rolls
2—24"x14" Rogers Iron Works Crushing Rolls
1—24"x12" Farrell Bacon Crushing Rolls
1—36" Telsmith Gyrosphere Crusher
1—No. 222, 322 Allis-Chalmers Type "B" Hydrocone Crushers
1—6", 10", 14", 15" and 20" McCully Superior Gyratory Crushers
36"—20" Traylor T.Y. Gyratory Crushers
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**BALL, ROD & TUBE MILLS**

1—7'x8', 6'x12', 5½'x10', 8'x8' Ball Mills
2—5'x16'; 1—5½'x10'; 1—6'x12' Rod Mills
2—5½'x20' Tube Mills
2—6'x22' COMPEB MILLS—6'x22' Tube Mills
1—10'x48", 8'x48", 6'x22" Hardinge Mills
3—3-Roll Bradley Hercules Mills, Direct Connected to 300 HP Motors

**MISCELLANEOUS**

1—8' and 16' Air Separators
8'x10', 6'x8', 12'10' Oliver Filters

*Have you any machinery that you want to sell?*

**W. P. HEINEKEN, INC.**
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**Phone Whitehall 4-4236**

## FOR SALE

20x36 Pioneer Jaw Crusher
18x32 Telsmith Jaw Crusher
18x30 Telsmith Jaw Crusher
9x21 Telsmith Jaw Crusher
15x40 Good Roads Jaw Crusher
36" Telsmith Gyrasphere Standard Crusher
3x10 Telsmith two deck Vibrating Screen
5x12 Telsmith single deck Vibrating Screen
4x 8 New Holland triple deck Vibrating Screen
1 100 HP Louis Allis Ball Bearing Motor
3 60-220-440 volts 1800 RPM Motors.

**BLUE BALL MACHINE WORKS**
**Blue Ball, Pa.**

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As Is—Where Is: One 5-yard American Revolver, Model 10125, Serial 179, 110' boom. Operates on railroad type mats. Powered by electricity. Can be seen in operation at our plant, Montgomery, Alabama.

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**80 TON GE DIESEL-ELEC. LOCO. NEW 1947.**
**44 TON GE DIESEL-ELEC. LOCO. REBUILT.**
**30 YD. WESTERN & KOPPEL AIR DUMP CARS.**
**25 TON AMERICAN DIESEL LOCO. CRANE. 1941.**
**1½ YD. P&H 455 DIESEL CRANE. 1952.**
**3 YD. LIMA 1201 DIESEL DRAGLINE. 1947.**
**7 YD. PAGE 6215 DIESEL WALKER DRAGLINE.**
**100 HP AMERICAN 3 DRUM ELEC. HOIST & SWINGER.**
**4 ft. SYMONS CONE CRUSHER. NEW.**

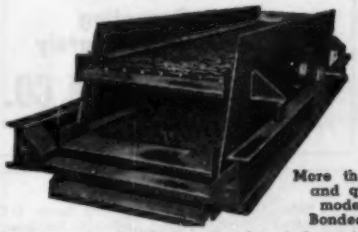
**MISSISSIPPI VALLEY EQUIPMENT CO.**
**813 Locust St. St. Louis 1, Mo.**

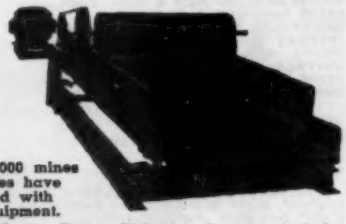
# BONDED EQUIPMENT BARGAINS

**WRITE, WIRE OR PHONE - IMMEDIATE SHIPMENT FROM OUR FACTORY**

## NEW BONDED® HEAVY DUTY VIBRATING SCREENS

**"For Continuous, Economical Screening of High Tonnages"**





**More than 5000 mines and quarries have modernized with Bonded equipment.**

For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry. HEAVY DUTY MODELS: 4-bearing, positive throw, eccentric shaft; 3'x8' to 5'x14', 1 to 5 decks. TYPE A SCREENS: eccentric weight mechanism, spring mounted, 1 to 3 decks, 2'x4' to 3'x8'.

**Heavy Duty Screens from.....$1095.00 General Purpose Screens from .....$395.00**

## NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS

Complete Ready-Fab sections quickly and easily joined together on the job. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS listed, with conveyor belting in two pieces. Conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2¼" or 2-7/16" diam. shaft. Belt is new 4-ply, 28-oz. duck, ⅛" top rubber cover x 1/32" bottom cover and is fresh stock made by leading manufacturers.

**Remember, You Save Up To 50%**

**CONVEYOR PRICES INCLUDE BELTING**

| Belt Width | Length of Conveyor | List Price | Sale Price |
|---|---|---|---|
| 14" | 25' | $1080 | $ 622 |
| 14" | 50' | 1830 | 985 |
| 16" | 20' | 991 | 548 |
| 16" | 45' | 1785 | 937 |
| 16" | 60' | 2309 | 1170 |
| 16" | 85' | 3103 | 1558 |
| 18" | 25' | 1229 | 684 |
| 18" | 45' | 1839 | 1005 |
| 18" | 60' | 2384 | 1254 |
| 18" | 85' | 3209 | 1665 |
| 18" | 100' | 3704 | 1912 |
| 20" | 25' | 1265 | 713 |
| 20" | 45' | 1965 | 1060 |
| 20" | 60' | 2490 | 1320 |
| 24" | 25' | 1322 | 773 |
| 24" | 45' | 2062 | 1145 |
| 24" | 60' | 2617 | 1426 |
| 24" | 100' | 4097 | 2166 |
| 24" | 130' | 5207 | 2773 |
| 30" | 25' | 1421 | 847 |
| 30" | 65' | 3101 | 1718 |
| 30" | 85' | 3731 | 2144 |

Other lengths & belt widths at bargain prices.

## NEW CONVEYOR BELTING

**SAVE UP TO 28%**

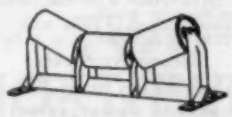
Heavy duty 4-ply, 28 oz. duck, 1/8" top rubber cover x 1/32" bottom cover rubber belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stock.

| Width | List Price | Sale Price |
|---|---|---|
| 14" | $3.23 foot | $2.50 foot |
| 16" | 3.64 foot | 2.62 foot |
| 18" | 4.03 foot | 2.90 foot |
| 20" | 4.42 foot | 3.35 foot |
| 24" | 5.23 foot | 3.76 foot |
| 30" | 6.39 foot | 4.60 foot |

Additional widths and plies available at low prices. Write for free sample.

## NEW IDLERS & RETURN ROLLS

**25% BELOW LIST PRICE**



**3-roll, 5" diameter Troughing Idlers for**

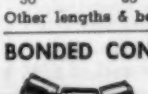
| | | | |
|---|---|---|---|
| 14" belt | $16.50 | 24" belt | $18.75 |
| 16" belt | 17.25 | 30" belt | 19.50 |
| 18" belt | 18.00 | 36" belt | 20.25 |
| 20" belt | 18.25 | 48" belt | 21.75 |

**1-roll, 5" diameter Return Idlers for**

| | | | |
|---|---|---|---|
| 14" belt | $6.38 | 24" belt | $7.50 |
| 16" belt | 6.75 | 30" belt | 8.25 |
| 18" belt | 7.13 | 36" belt | 8.75 |
| 20" belt | 7.30 | 48" belt | 10.25 |

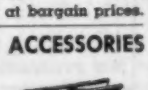
**All steel. Interchangeable with other well-known makes. Replaceable ball bearings. Either sealed type (pre-lubricated) or with alemite fittings. Rust proof ball races. Maintenance is negligible.**

## BONDED CONVEYOR ACCESSORIES



Self-Aligning Idler $56.50

Guide Idler $13.75



Wing Pulley $74.00

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**110 Bellview** PHONES: Hickory 4-2186; FR 6-3698, Evenings **COLUMBUS 7, OHIO**

**DEPENDABLE USED MACHINES**

Special—Model 1020A Unit ⅝ yd. dragline with GM Diesel motor and wide shoes.

40' bucket elevator
Mesabi 5x12 screen
Mesabi 4x16 screen
Dart 18 ton rock truck
Reo 6x4 chassis
Universal 880 Diesel gravel plant
Cedar Rapids 30x18 roll crusher
Cedar Rapids 16x16 roll crusher
45 ton, 3-comp. portable steel bin
Northwest ⅝ yd. truck crane
Koehring 503 crane
Bay City 45 dragline
Byers 62 shovel
Eagle cinder crusher
3 yd. Dumpcrete

These machines reconditioned in our newly-built daylight plant. Come see them!

**10004 Southwest Highway TRACTOR & EQUIPMENT CO. Oak Lawn, Ill.**

**EQUIPMENT LOCATED**
**GA. - N.Y. - CALIF. - OHIO - TEXAS - ILL.**

**GRINDING MILLS**
BALL MILLS—3x7, 5x10, 6x7, 6x8, 6x9, 6x10, 6x12, 7x7, 7x5, 7x6, 8x6, 5x14 & 5'x18'. Also 5'x8'.
HARDINGE—10"x48", 8"x48", 8"x22", 8"x18", 6" x36".
ROD MILLS—3x10, 4x7, 4x14, 5x10, 5x14, 6x12 & 8'x12'. Also 5'x12'.
TUBE MILLS—3'x12', 5'6"x22', 5'x18' & 6'x22'

**HAMMERMILLS**
WILLIAMS GA30—24x30 & GA60—24x60.
DIXIE 5040—MOGUL 50x40.
GRUENDLER 5XD—48x30—250 H.P. MOTOR.
JEFFREY B2—36x24—75 H.P. MOTOR.
PENNA. NXR—100 TPH.
UNIVERSAL No. 4—36x26.
DIXIE 30"x30".
PENNA. THOR SXT 13-48. Size 48x54.

**HEAVY DUTY APRON FEEDER**
REX 54" x 10'3" Slat Type.

**AIR SEPARATORS**
5 Sturtevant 10', 14' & 16'.
4 Gayco 8', 6' & 5'.

**FILTERS, SEPARATORS—CLASSIFIERS**
11'6"x18', 14'x18' & 9'x10' Oliver Drum Filters.
8'x20' Dorr DSD Duplex Classifier.
6'x14' HARDINGE COUNTER CURRENT.
DINGS MAGNETIC TYPE IB 3 STAGE 60".
DORR 40' DIA. X 30'—3 TRAY, 4 COMP. THICKENER. ALSO 3 DORR A 26'x10'.
RAKE & BOWL CLASSIFIERS, 2x15 SSFR, 6x22 DSF DORR 3x24', 10"x10" TURRENT BOWL.
2'x24'x12' Wemco Bowl Classifier.
4'6"x26'x16' Wemco Bowl Classifier.
26' Dorr Thickener & Tank.
5—Wemco Thickeners, 14x12 & 20x12.
2—Wemco 10'x50' Sand Launders.
No. 1 Wemco 5/25 TPH WKE (HMS) Mobil Mill.

**ROTARY DRYERS & KILNS**
ROTARY KILNS: 4x42', 6'x8'x60', 8'x150', 9'x125', 6'x28', 6'x7'x80', 5'x125', 2—7'x110', & 3—9'x80'
ROTARY DRYERS: 3 x26', 4'x40', 5'x35', 6'x40', 6'x80', 11'x75', 4'x26' & 90"x60'.
2—7'6"x55'xA14 Ruggles Coles, 2 shell.

**JAW CRUSHERS**
BLAKE TYPE—66x84, 40x48, 42x48, 48x60, 24x36, 18x36, 15x30, 13x30, 12x24, 12x16, 10x20, 30x42.
SINGLE SHAFT—18x36, 15x36, 15x30, 10x40, 10x30, 10x20.
CAM & ROLLER—24x40, 14x26, 11x20, 10x20, 6x20.

**GYRATORY FINE REDUCTION CRUSHERS**
NEWHOUSE 7", 10", 14"—KENNEDY 19S, 25S, 37—SUP. McC. 6" & 10" AL. CHAL. 222B, TRAYLOR TY 36".

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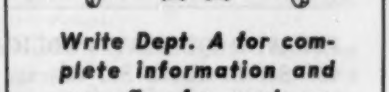

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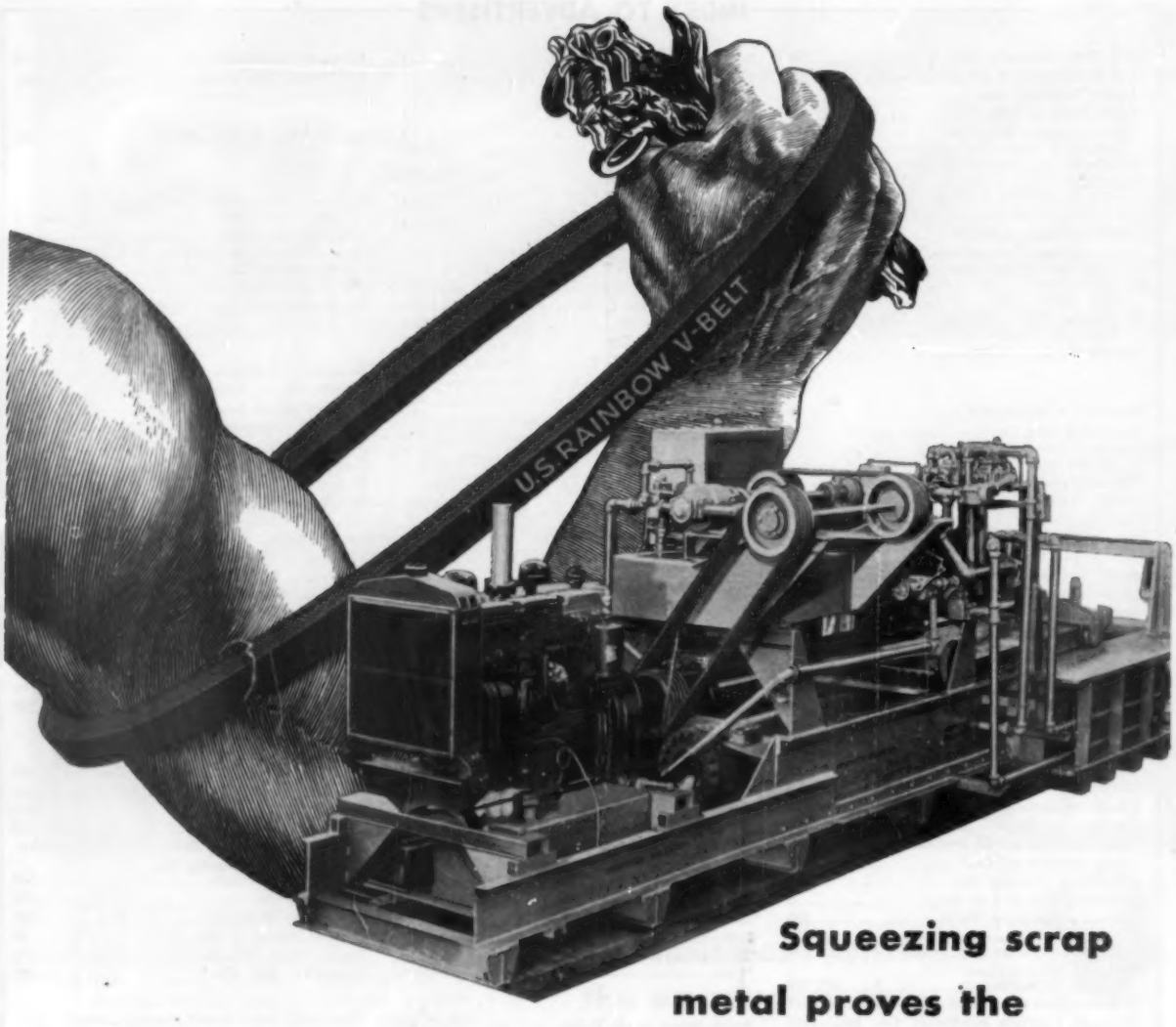


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Many scrap metal dealers use the Dempster-Balester to bale sheet metal into easy-to-handle units. The tremendous power of the machine puts terrific shock loads on V-Belts —U. S. Rainbow® V-Belts. These muscular belts stand up under this treatment because they each have the unique Equa-Tensil Cord Section, a scientifically developed "U. S." construction that brings together in a balanced unit the concentrated strength of multiple pulling cords, distributes the load so evenly among the cords that each carries its full share of the load.

U. S. Rainbow V-Belts have greater gripping power, without slippage, because the straight sidewalls grip the grooves the full height of the belt. Every ounce of excess stretch is worked out mechanically before leaving the factory, yet the belt remains elastic enough to stand heavy shock loads.

U. S. Rainbow V-Belts are obtainable through any of our selected distributors, or any of United States Rubber Company's 27 strategically located District Sales Offices, or write address below.

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**MULTIPLE V-BELTS • F. H. P. V-BELTS • SHEAVES**
**FLAT BELTS AND BELTING • SPECIAL PURPOSE BELTS**
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***"U. S." Research perfects it***
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# Farval helps keep walking dragline working —no lost time for lubrication

FARVAL—
*Studies in Centralized Lubrication*
No. 168

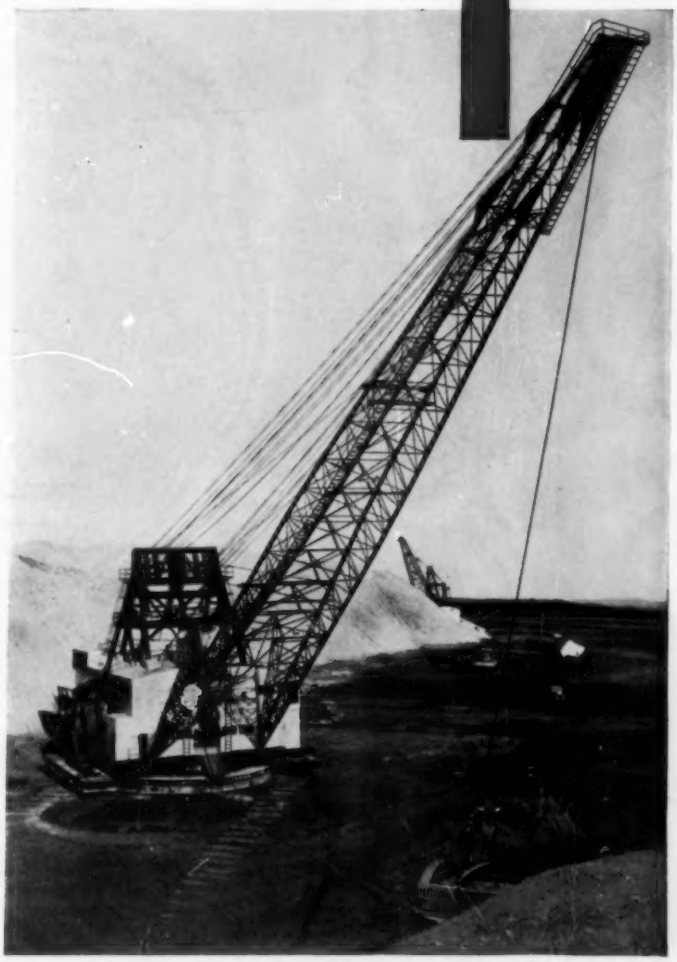
LUBRICATION requirements of this giant walking dragline are as complex as the machine itself. It was a tough problem to solve, but a planned Farval Centralized Lubrication System did it. Now, Farval helps keep the dragline working uninterruptedly with minimum time for lubrication.

The entire walking machinery needs a fresh supply of lubricant about every five steps—length of each step is 6 feet 2 inches. Hoisting, dragging and swinging machinery require lubricant on an 8-hour basis. 108 rollers in a roller circle that supports and permits rotation of the control house, require lubrication once every 24 hours. All told, 206 bearings require regular lubrication.

These varying lubrication frequencies are all handled efficiently and surely by one Farval automatic system divided into branches. Any part of the machinery can be lubricated independently of the others.

If you have an equipment lubrication problem, simple or complex, it will pay you to find out how a Farval Centralized Lubrication System can save you time, money and lubricant. Farval delivers oil or grease unfailingly, in the exact amount required when needed, to each bearing served. It can be installed on new or old equipment, often pays for itself in a few weeks or months. Thousands of Farval installations are improving lubrication and operations in practically all industries. Find out how Farval can help *you*. Write for technical advice and ask for Bulletin 26. The Farval Corporation, 3280 East 80th Street, Cleveland 4, Ohio.

*Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.*



**Farval-lubricated walking dragline, one of the largest standard production machines of its kind in the world, serving at a Texas mine.**

**KEYS TO ADEQUATE LUBRICATION—Wherever you see the sign of Farval—the familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine is being properly lubricated. Farval manually operated and automatic systems protect millions of industrial bearings.**

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**DO IT** by lubricating with *Texaco Regal Oil R&O* —the oil that prevents rust and harmful deposits in the system, keeps lines clear, valves working properly, piston rings free.

*Texaco Regal Oil R&O* is premium quality. It is carefully refined from selected base stocks, then *further improved* by effective additives and special processing. There is a complete line of *Texaco Regal Oils R&O* so that, whatever the type and size of compressor, whatever the operating conditions, you can be sure of getting the most efficient and economical operation.

For your drills, use *Texaco Rock Drill Lubricant EP*. Its effective extreme pressure properties will assure the best possible protection against wear and, in addition, your drills will be protected against rust whether running or idle.

A Texaco Lubrication Engineer will gladly help you get maximum performance from all your equipment. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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